

**Massachusetts**  
**Life Sciences Workforce Conference**  
**May 31, 2023 | 8:30 am - 4:00 pm**  
**University of Massachusetts, Boston**

# Welcome



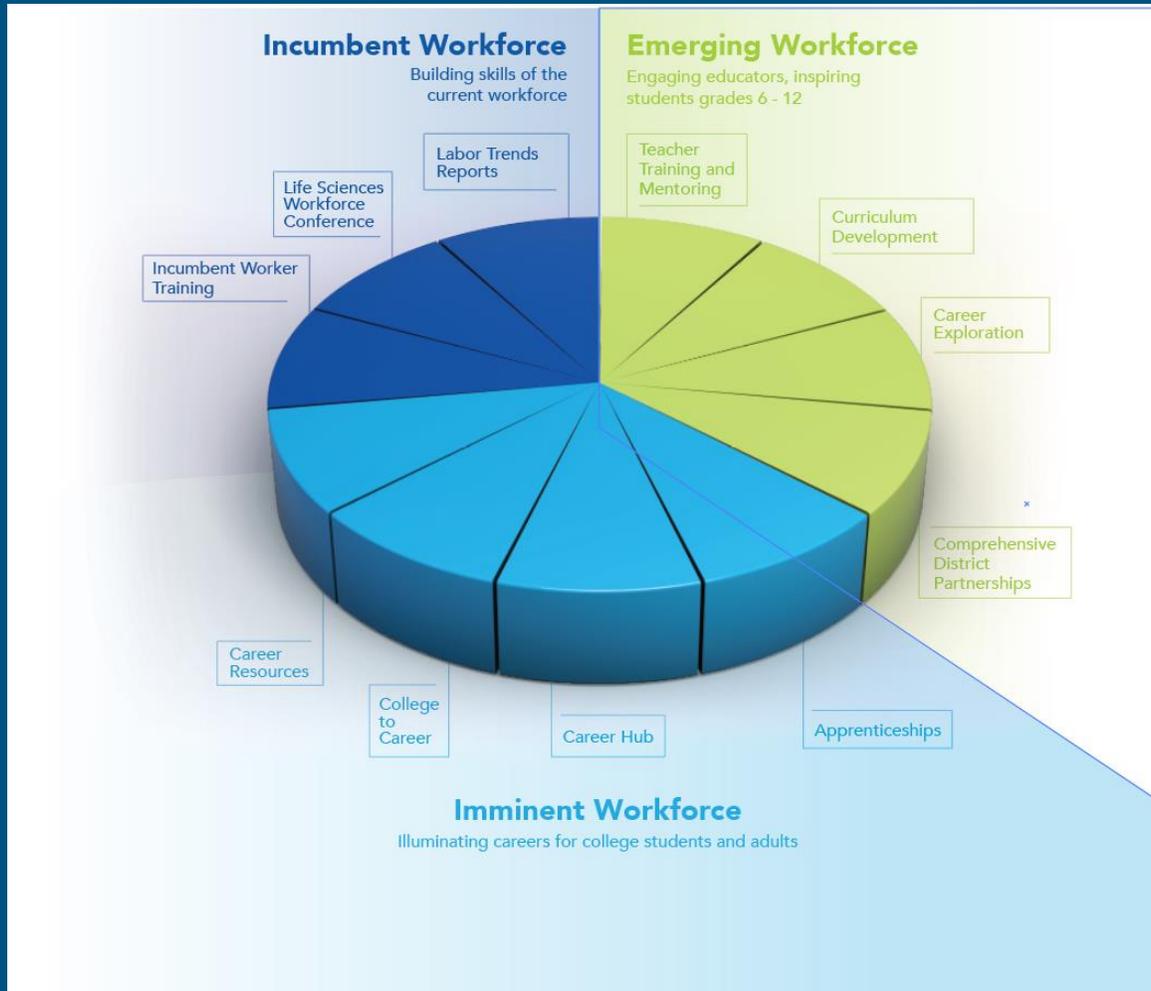
Sunny Schwartz

*CEO, MassBioEd*

# Agenda

- 9:30 am MassBioEd's 2023 MA Life Sciences Employment Outlook | Workforce Challenges and Demands
- 10:15 am Industry Best Practices to Attract and Develop Talent
- 11:15 am Break and Networking
- 11:30 am Looking Outside the Box: Accessing Untapped Talent
- 12:15 pm Lunch and Networking
- 1:10 pm Public Policies: How Do Industry, Government, and Educators Work Together to Prepare Talent for 2033?
- 2:25 pm Industry-Educator Advisory Session  
Reducing Structural Inequity through Systems Designs and Workshop
- 3:00 pm Dessert Reception \***Alumni Lounge**

# MassBioEd | Programs



## BioTeach

- Curriculum
- Teacher Training
- Career Exploration
- ACCESS Program

## BioTalent

- Apprenticeship Program
- Professional Training Courses
- Labor Market Information
- College to Career
- Career Resources

# Life Sciences Apprenticeship Program



# College to Career

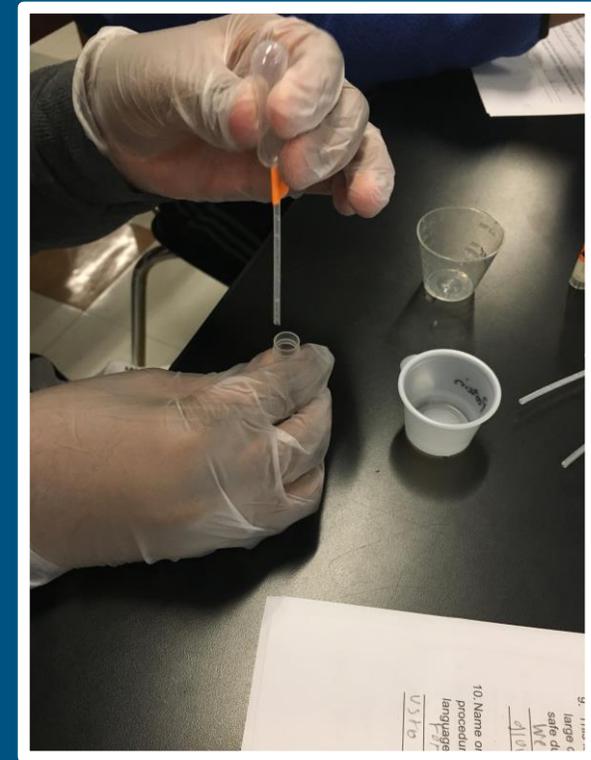
UMass  
Boston Expo



Takeda Visit

Fitchburg State University

# BioTeach



# MassBioEd | 2022 Impact



**10,000 students**  
served in biotechnology lab  
and career awareness experiences



**100% ACCESS schools**  
reached were economically  
disadvantaged or high-need



**622 professionals**  
obtained new skills through  
professional development courses



**154 teachers**  
received hands-on training  
in leading authentic  
biotechnology lab explorations



**95% of apprentices**  
transitioned to on-the-job  
training at employer  
partner companies  
  
**65% of apprentices are  
People of Color**

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# Thank You to Our Sponsors!



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# Funders



City of Boston  
Workforce Development



THE COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT



LIFE SCIENCE CARES  
boston



Thank You  
University of Massachusetts, Boston  
For Hosting the 2023 Life Sciences Workforce Conference



# Welcome



*Joseph Berger*



*Monique S. Cooper*

*University of Massachusetts Boston*

# Welcome



Donald Wright  
*City of Boston*

# Welcome



Emerson Foster

*Takeda*

# 2023 Massachusetts Life Sciences Employment Workforce Challenges and Demands



**John Brothers**

*MassBioEd*



**Alicia Sasser Modestino**

*Northeastern University*



# Massachusetts Life Sciences Employment Outlook, 2023

Prepared by TEconomy Partners, LLC for MassBioEd

May 2023





**Innovations that save lives**  
here and all over the world

**Jobs and economic  
growth** for the  
Commonwealth





## **Demand exceeds supply**

**Despite:** Strong education pipeline  
& Strong in-state retention

**Key Threat:** Life sciences talent  
“leakage” to other STEM-intensive  
sectors



# Defining the Scope: Life Sciences in Massachusetts



## Industry Sectors Associated with Life Sciences

The  
Outlook  
focus:  
**Biopharma  
and  
medical  
labs**

**Biopharma  
& Medical  
Labs**

**72%**  
of  
Employment

**Medical  
Devices  
& Equip.**

**18%**  
of  
Employment

**Hospitals**

**6%**  
of  
Employment

**Colleges &  
Universities**

**3%**  
of  
Employment

# Steady Life Sciences Growth for MA the Past Decade

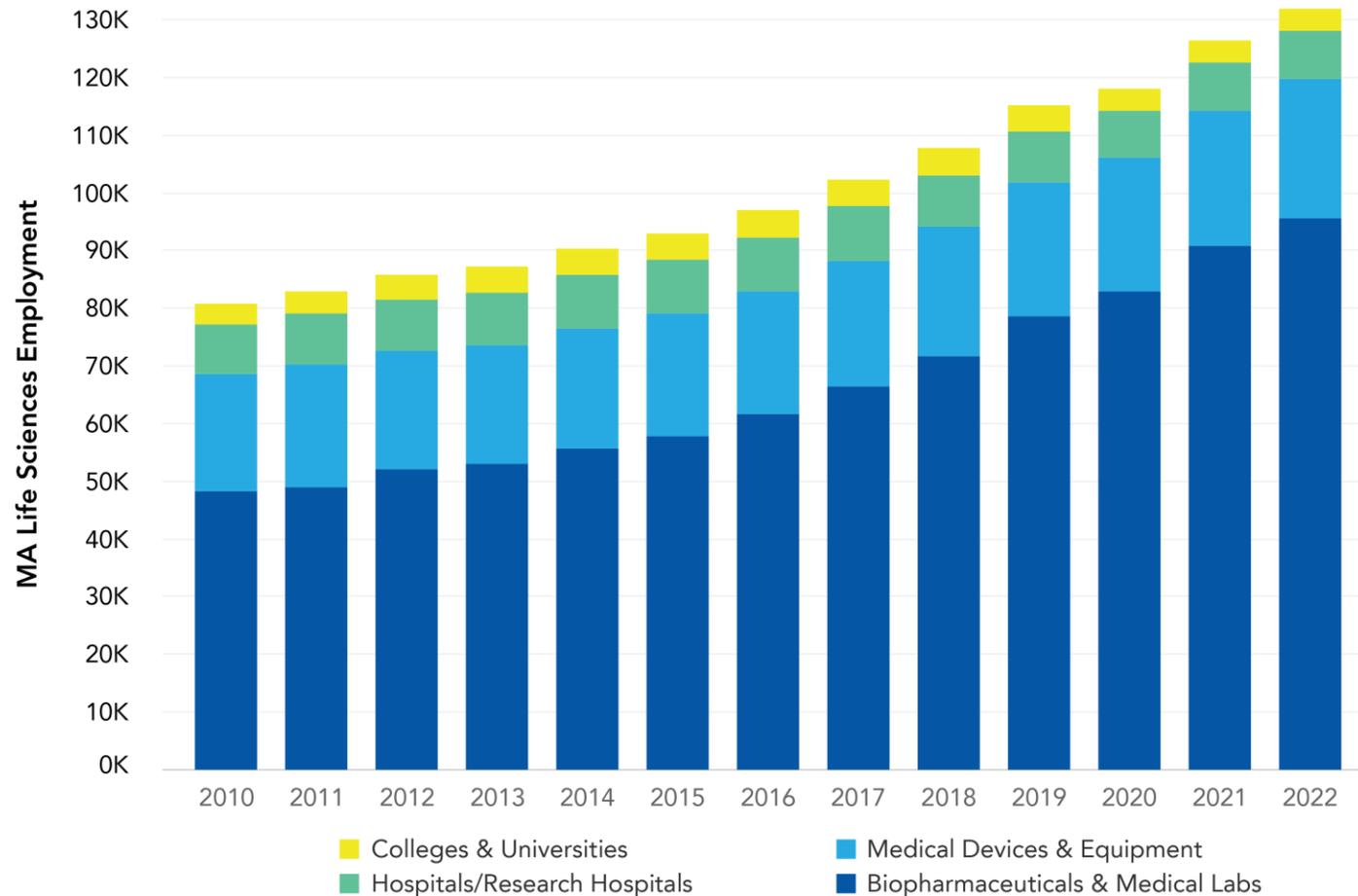


In 2022:  
**132,000 total  
life sciences  
jobs**

across all  
industry  
segments

**Growth of more  
than 5,600  
from 2021**

## MA Life Science Industry Employment Trends 2010-2022



# MA Life Sciences Industry Has Continued to Grow its High Skills Labor Segments



Job growth in key occupational segments since **2019**:

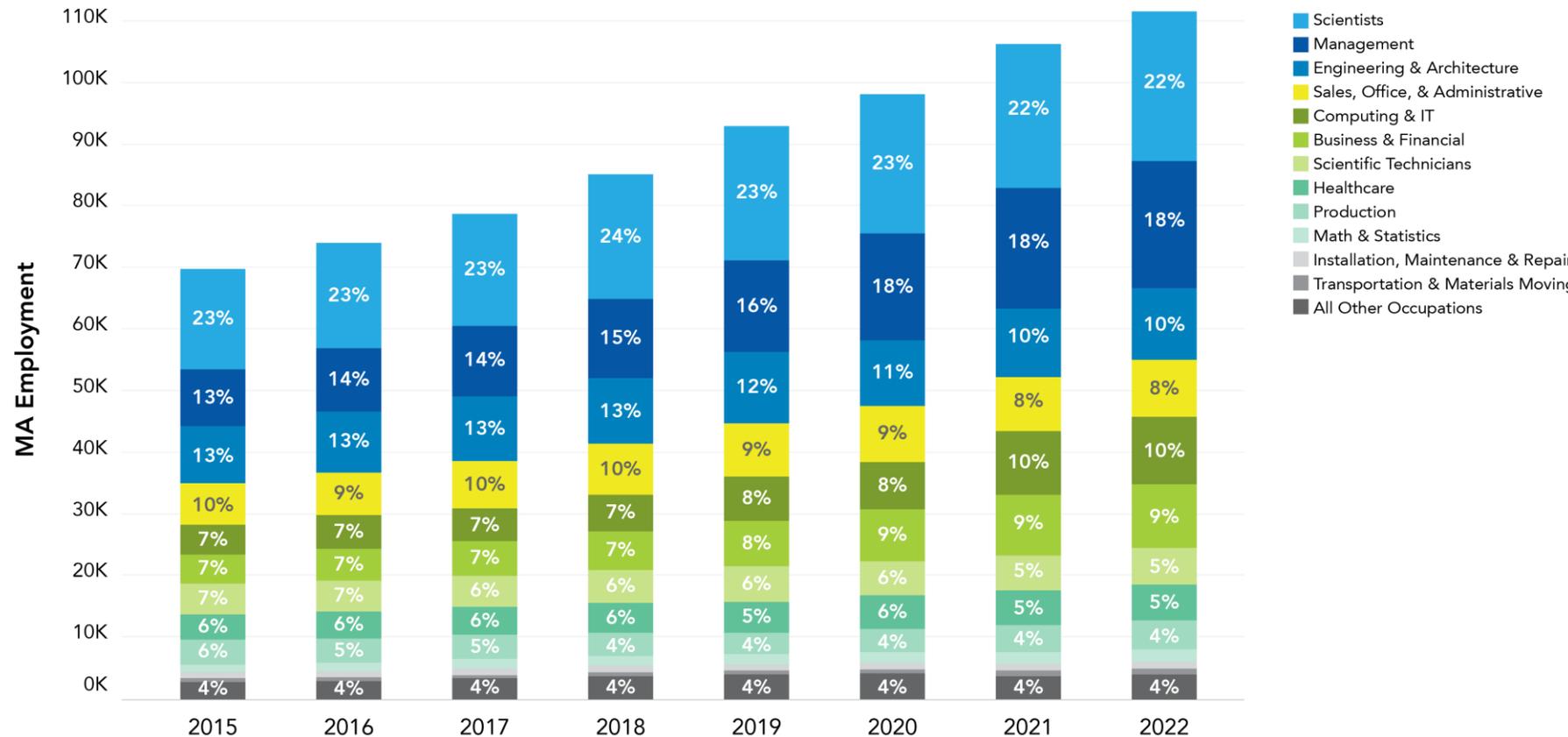
**Life Scientists** 2.7k jobs  
13% growth

**Management** 5.6k jobs  
38% growth

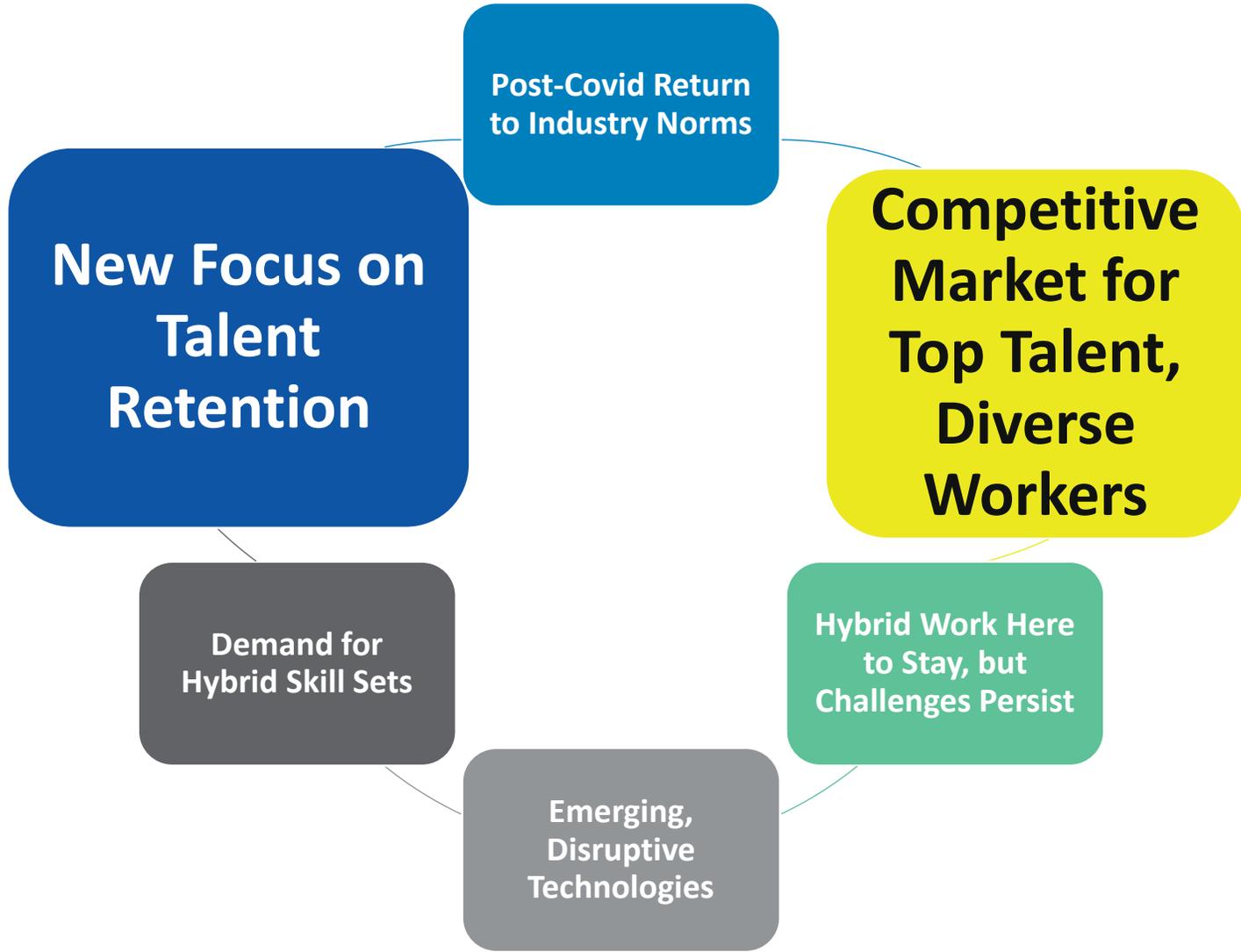
**Computing & IT** 3.8k jobs  
52% growth

**Business & Financial** 3k jobs  
40% growth

Occupational Employment Trend Within  
MA Biopharmaceuticals & Medical Labs Industries, **2015-2022**



# Themes Emerging from Executive Interviews\* Conducted as Part of the CSBI Workforce Trends Assessment

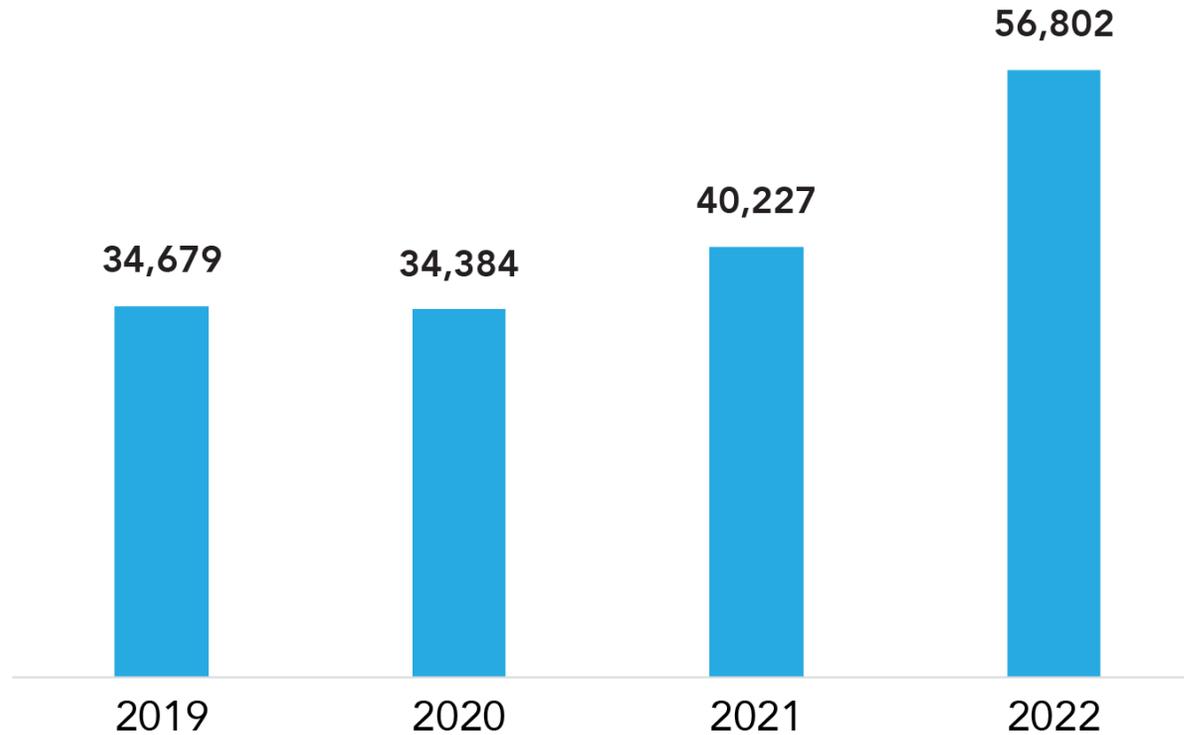


Companies participating in interviews:





## Life Sciences Job Postings, 2019-22



# Who's Hiring: Leading Companies Hiring in MA Life Sciences



17 major employers with more than 2,000 unique job postings

## Top 20 Companies by Unique Job Postings for 2019-22

Takeda Pharmaceutical Company
Sanofi
Moderna Therapeutics
Vertex Pharmaceuticals
Biogen
Pfizer
Charles River Laboratories
Johnson & Johnson
Quest Diagnostics
IQVIA
Bristol-Myers Squibb
Broad Institute
AstraZeneca
Novartis
Alexion Pharmaceuticals
Foundation Medicine
AbbVie
MilliporeSigma
Eurofins
Labcorp Drug Development

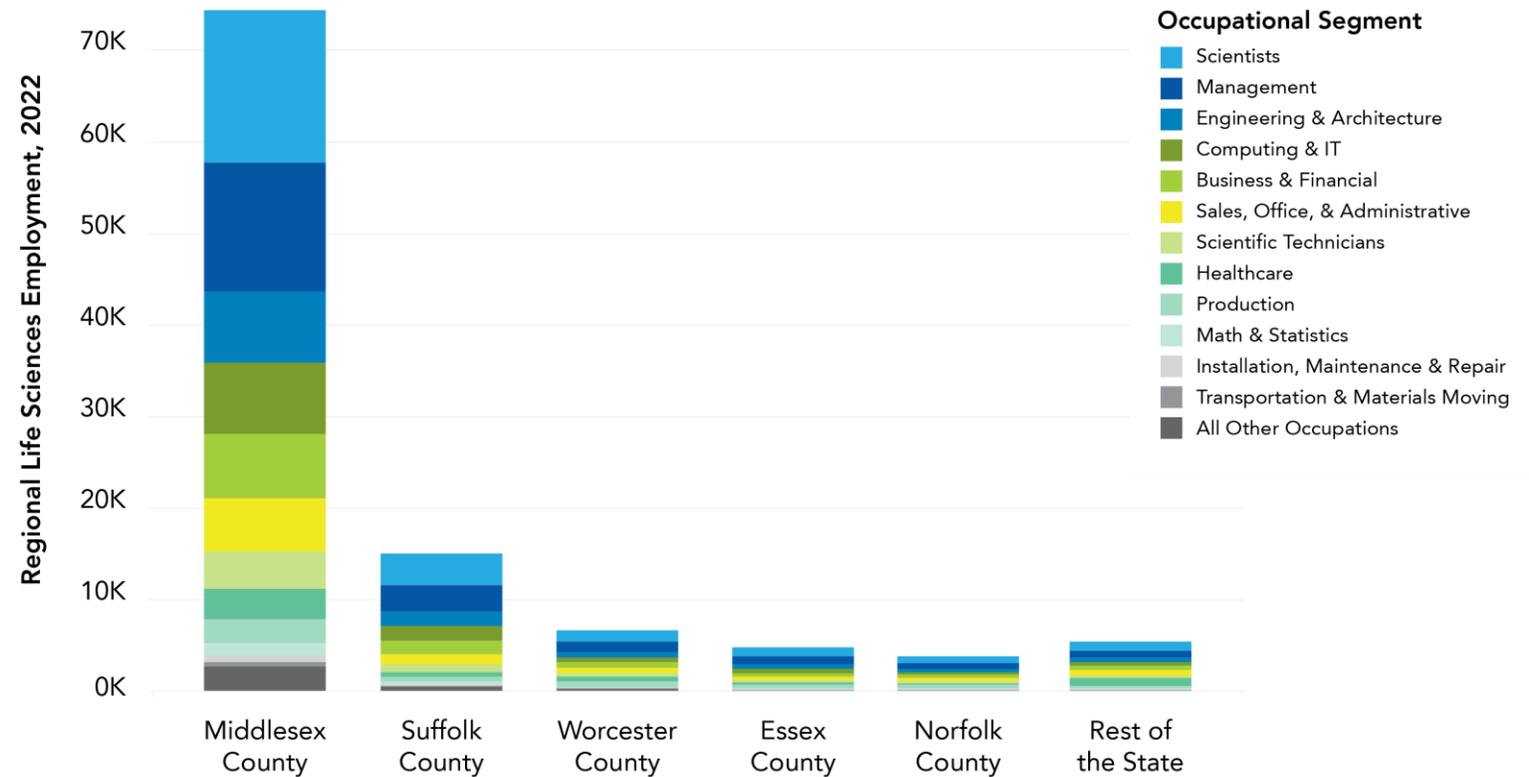
# Regional expansion continues



## Growth in life sciences jobs from 2019-2022

Middlesex County	19% growth
Suffolk County	32% growth
Worcester County	24% growth
Essex County	11% growth
Norfolk County	17% growth

## Geographic Distribution of Occupational Employment Within MA Life Sciences Industries, 2022





**Massachusetts projects  
to grow life sciences  
jobs by 32%**

**or**

**42,000 NET new jobs by  
2032**





## Projected Occupational Growth Trends Within Biopharmaceuticals & Medical Labs, 2022-32



Scientists	35%	Business & Financial	37%
Management	34%	Scientific Technicians	38%
Computing/ IT	49%	Math & Statistics	56%
Engineering/ Architecture	39%		

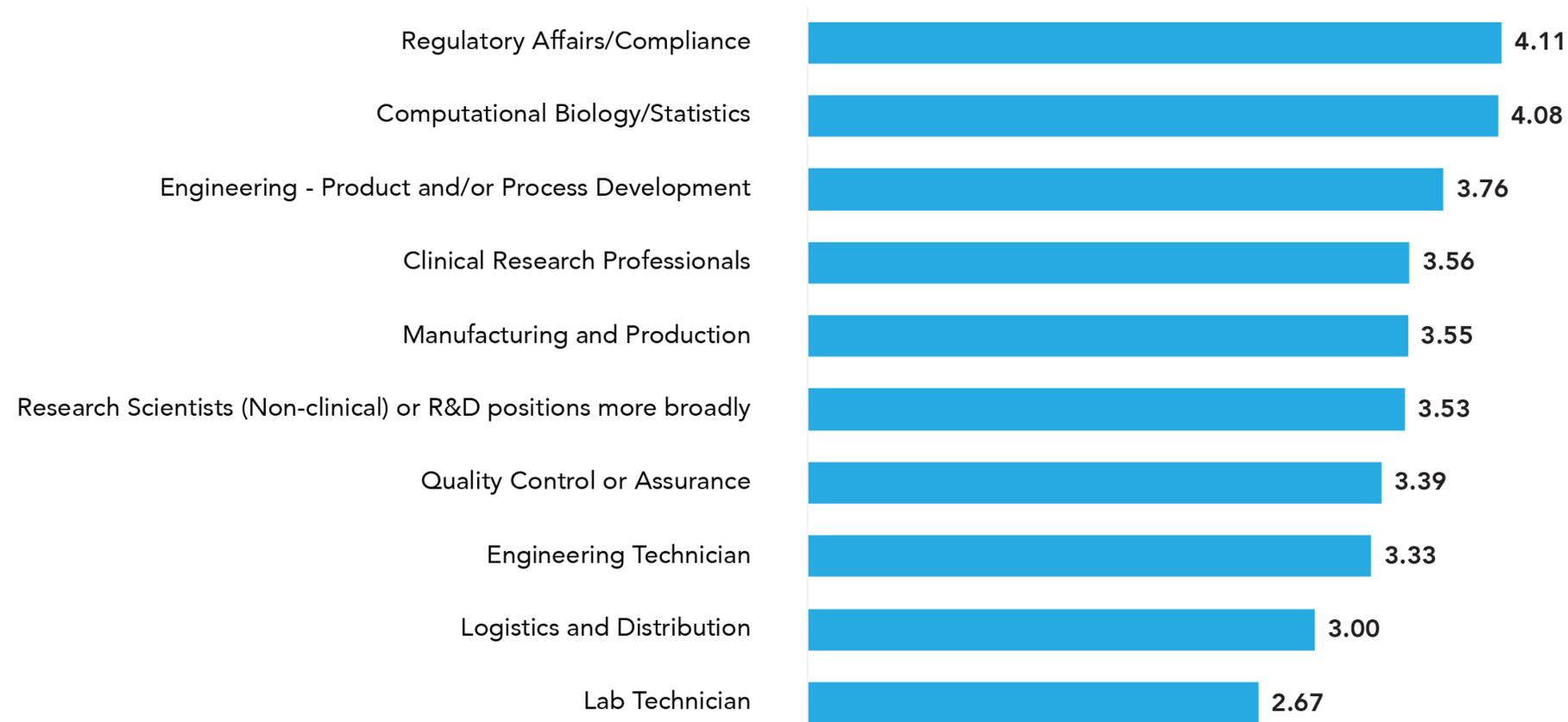
*Segments listed with at least 1k projected new jobs  
and >30% job growth from 2022-2032*

# Many MA Life Sciences Companies Reported More Difficulty in Finding and Hiring Qualified Candidates in Certain Specialized Roles

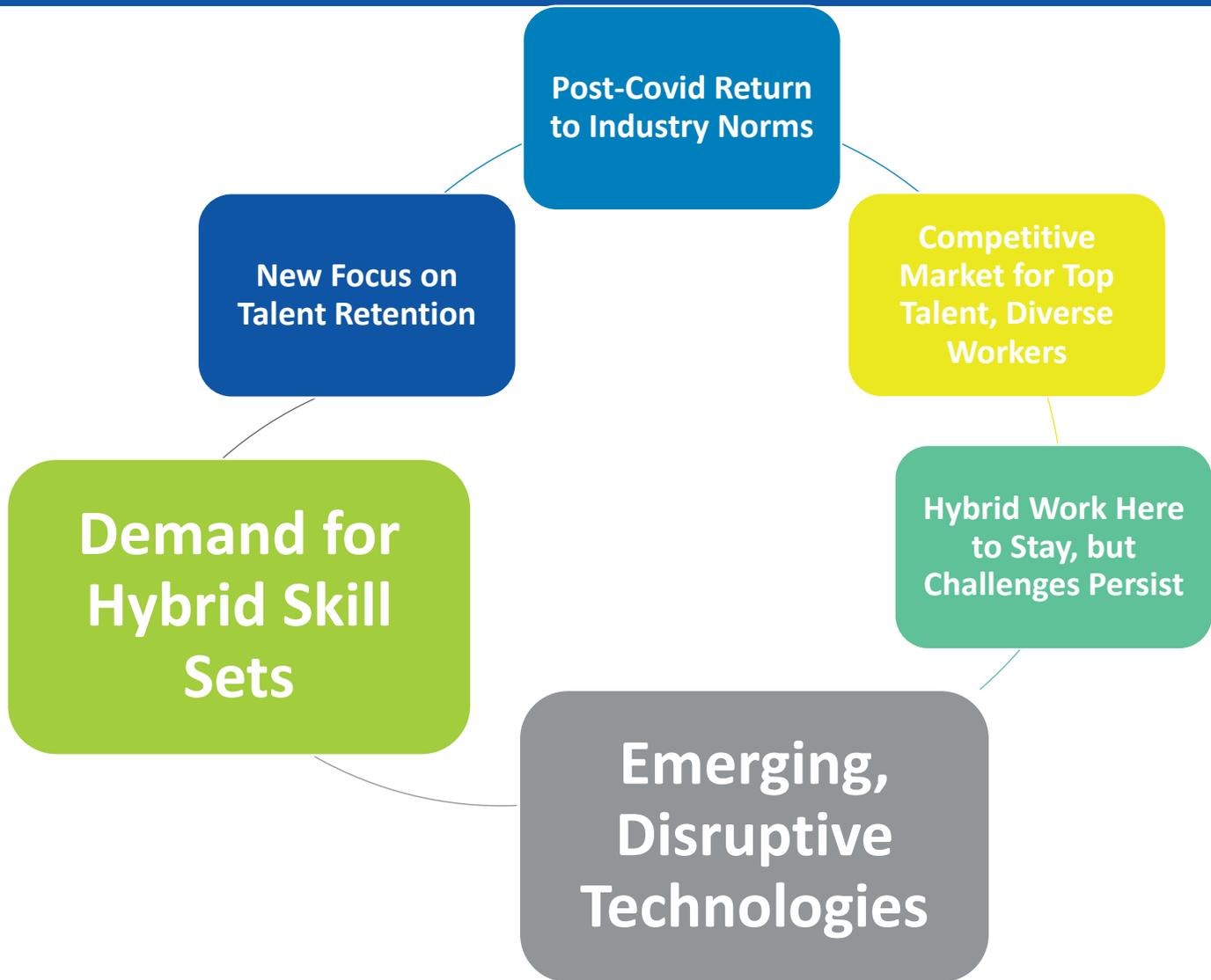


- **Regulatory affairs**
- **Computational biology**
- **Bioinformatics** are the most challenging to hire

Life Sciences Occupational Roles Ranked by Respondents in Avg. Difficulty in Hiring Score, 5 = highest (n = 38)



# Themes from **Executive Interviews**\* from the CSBI Workforce Trends Assessment



Companies participating in interviews:



# Demand for workers continues to exceed supply



Projections indicate

**6,617 average annual job openings** over the next decade

State educational institutions productivity may be **limited to 3,304 new workers annually**

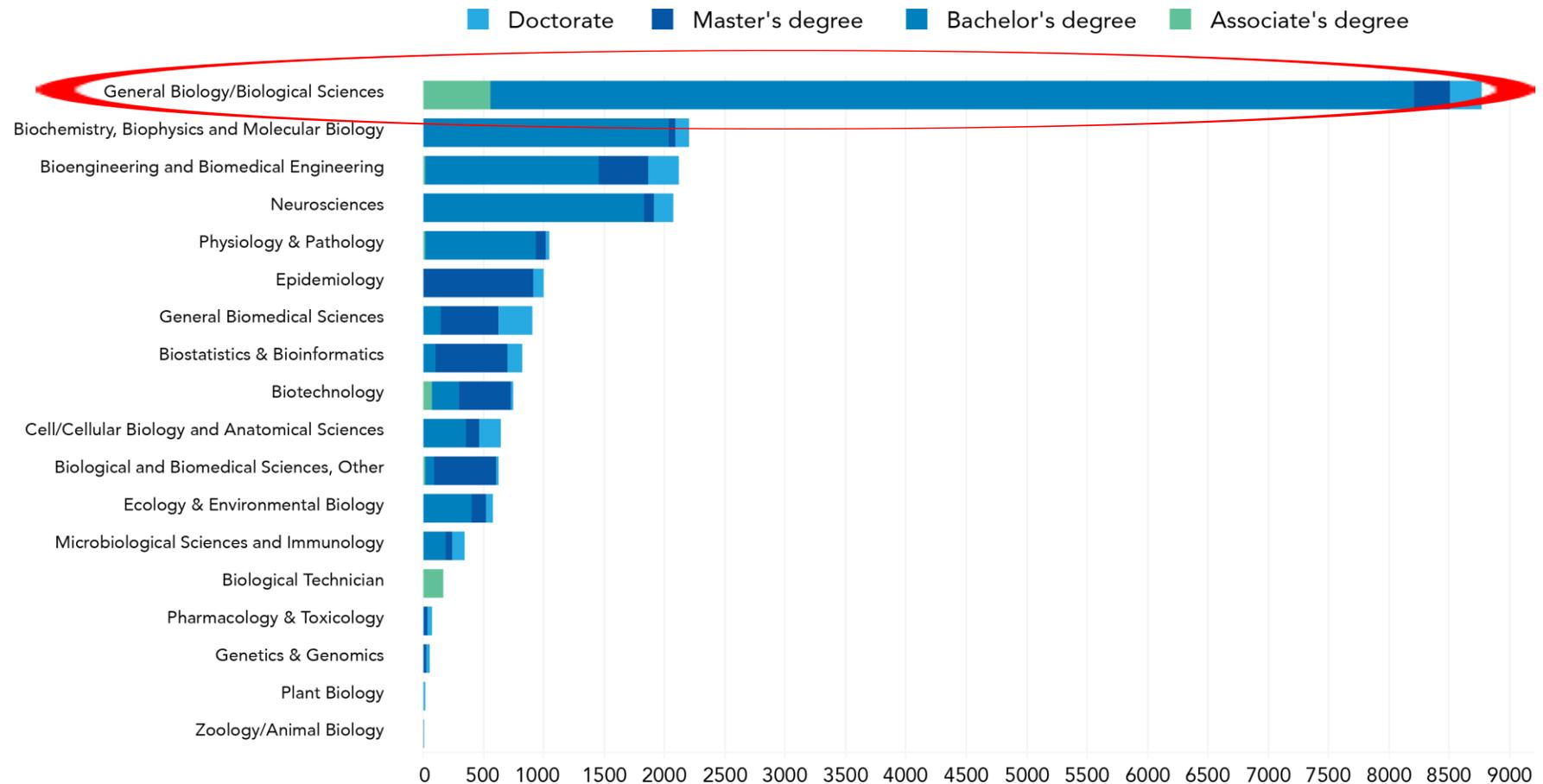


# Massachusetts's specialized education pipeline



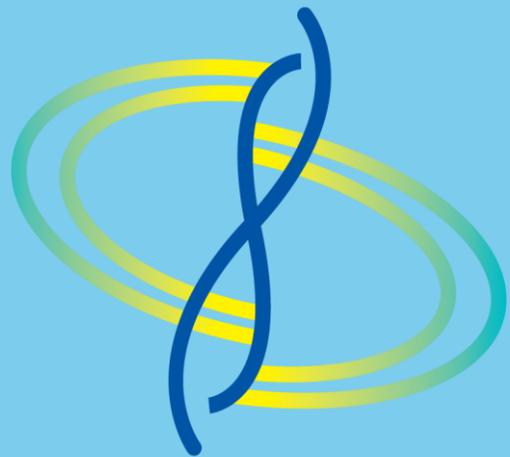
- For example, MA produces nearly **11% of the nation's supply of biostatistics and bioinformatics program graduates**, and **over 16% of the nation's supply of epidemiology program graduates**

Leading Life Sciences Degree Fields in Massachusetts, 2020-2022



Total Life Sciences Degree Completions, 2019-2021

# Demand Continuing to Outpace the Talent Pipeline



High demand for **hybrid skills** highlights changes to life sciences work, calling for:

- **New approaches** to education, talent development, and recruitment,
- Increased career awareness in **non-life sciences** fields

# Student Career Awareness



Students pursue career paths and future opportunities that help turn their interests into careers

**Agency: Student Insights in BioTech Opportunities, Today, 2:30pm**

# 1st Recommendation: Industry and Higher Ed



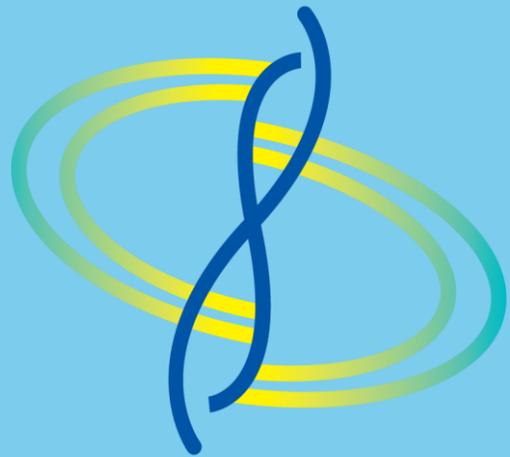
- **Invest in postsecondary early-career connections for grades 9-16**
- Expand awareness of life sciences industry career opportunities **among a broader set of degree programs and educational settings**

## 2nd Recommendation: Government, Industry and Higher Ed



- Expand specialized life sciences education programs to **more public institutions and underserved communities**
- **Advance diversity, equity, and inclusion in the life sciences**

# 3rd Recommendation: Higher Education



- Advance multidisciplinary “hybrid” programs and credentials to meet evolving life sciences talent demands

Examples:

- **science + technology/analytics**
- **business/project management expertise + foundational scientific**



Northeastern University  
**Dukakis Center for  
Urban and Regional Policy**

Alicia Sasser Modestino  
Research Director  
Dukakis Center for Urban and Regional Policy

**2023 Life Sciences Workforce Conference**  
*Unlocking Talent in the Life Sciences*  
*May 31, 2023*

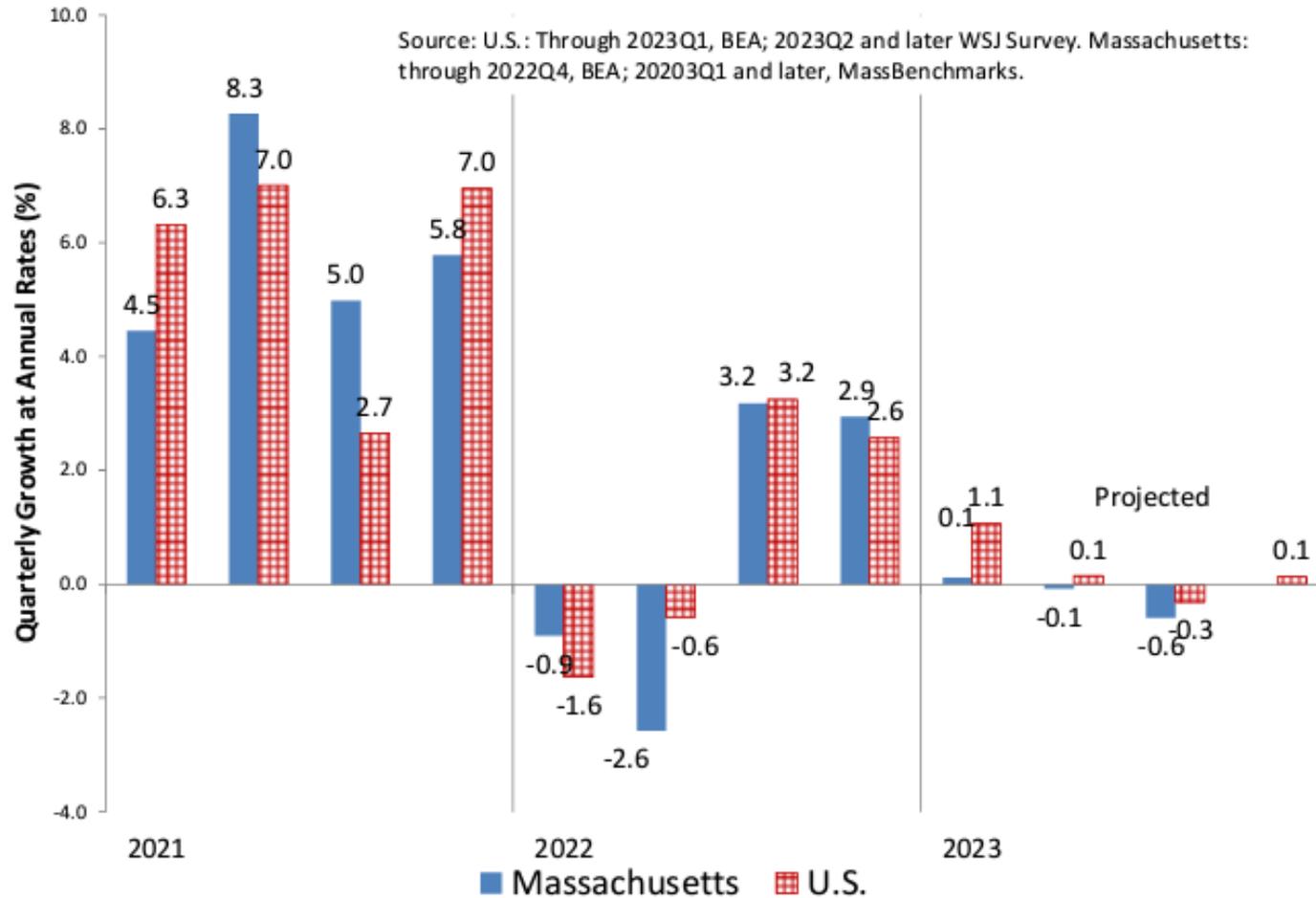


Northeastern University  
**School of Public Policy  
and Urban Affairs**



# MASSACHUSETTS ECONOMIC GROWTH IS EXPECTED TO SLOW IN 2023....

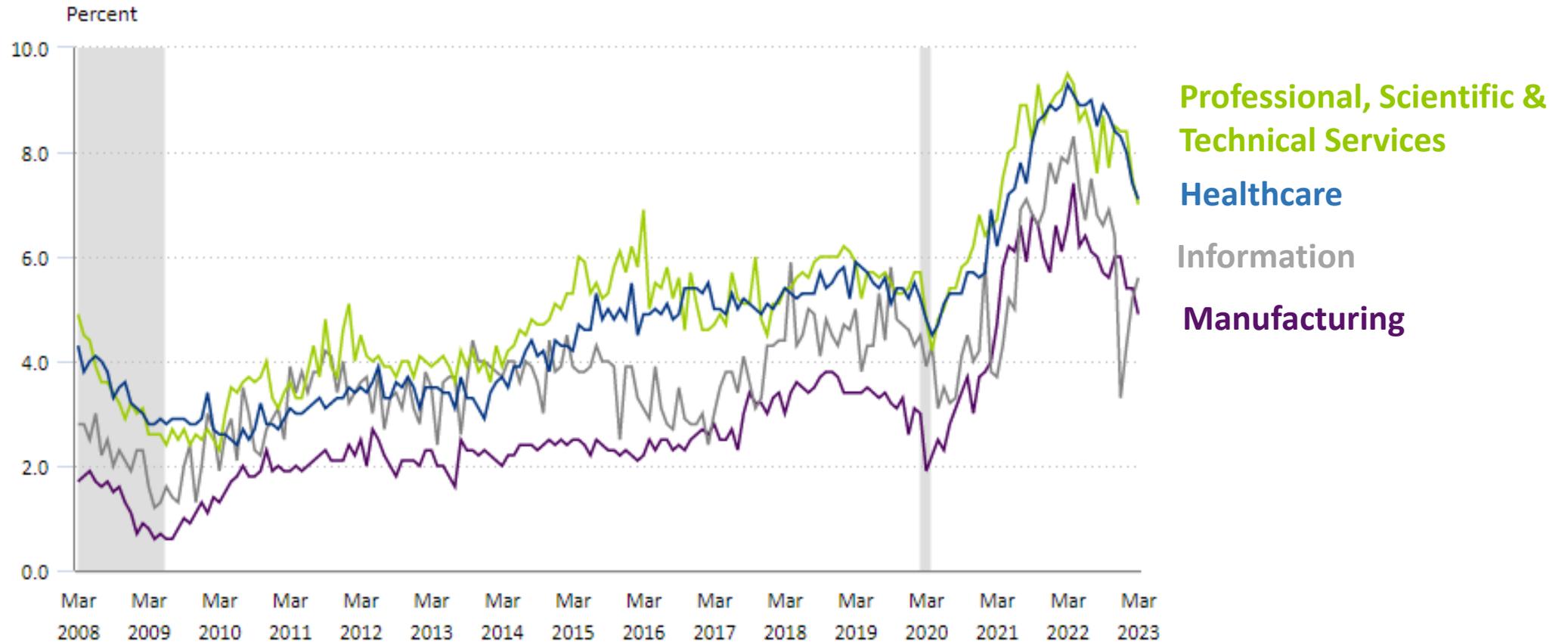
## Growth in Real Product, Massachusetts vs. U.S.



Source: Massachusetts Department of Unemployment Assistance.

# ALREADY LABOR DEMAND IN KEY INDUSTRIES SHOWS SOME SOFTENING ....

## Job Openings Rates by Industry Sectors, U.S.



Hover over chart to view data.

Note: Shaded area represents recession, as determined by the National Bureau of Economic Research.

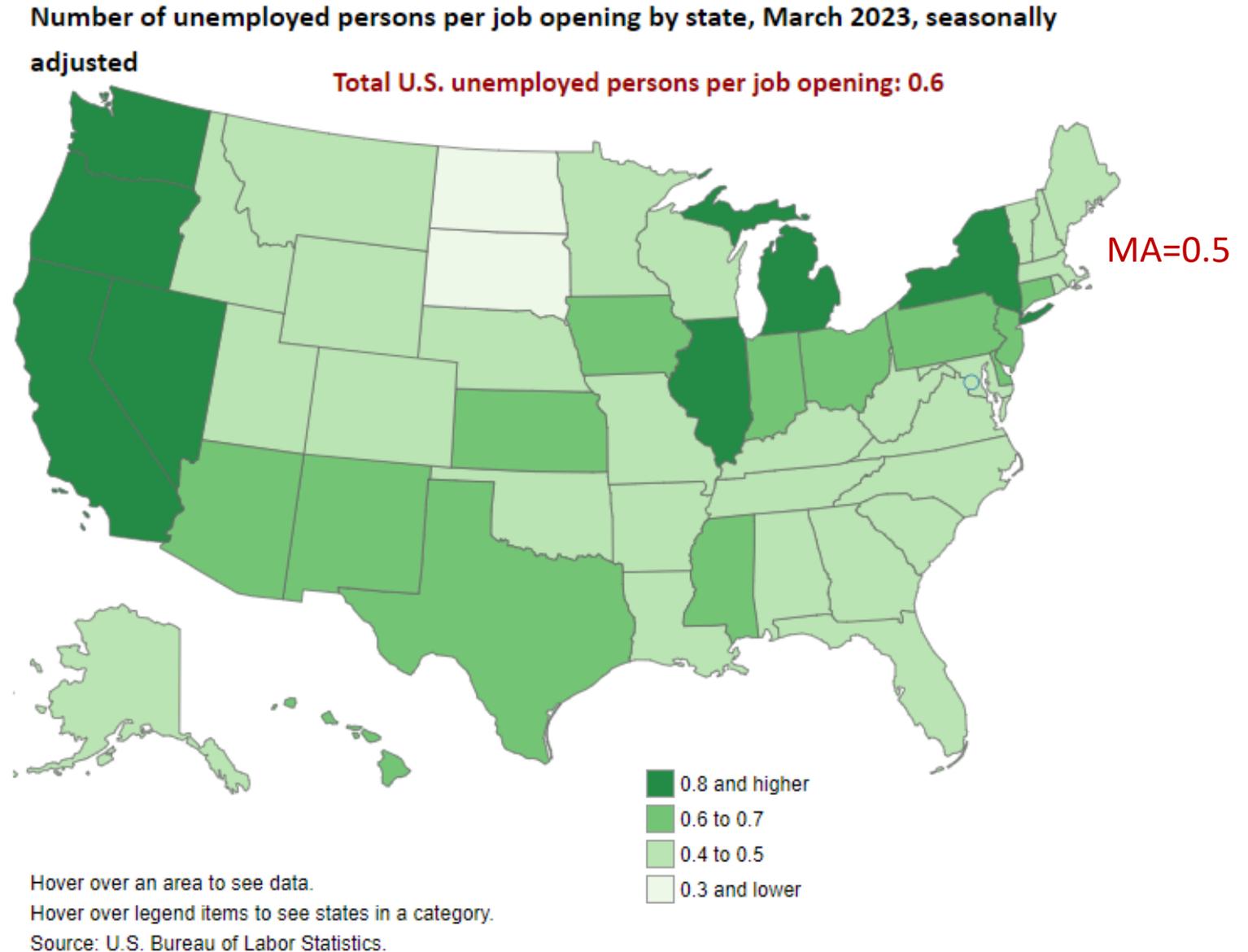
Source: U.S. Bureau of Labor Statistics.

Source: U.S. Bureau of Labor Statistics.

# STILL HISTORICALLY TIGHT LABOR DEMAND, ESPECIALLY IN MASSACHUSETTS....

All labor market indicators still point to an historically tight labor market.

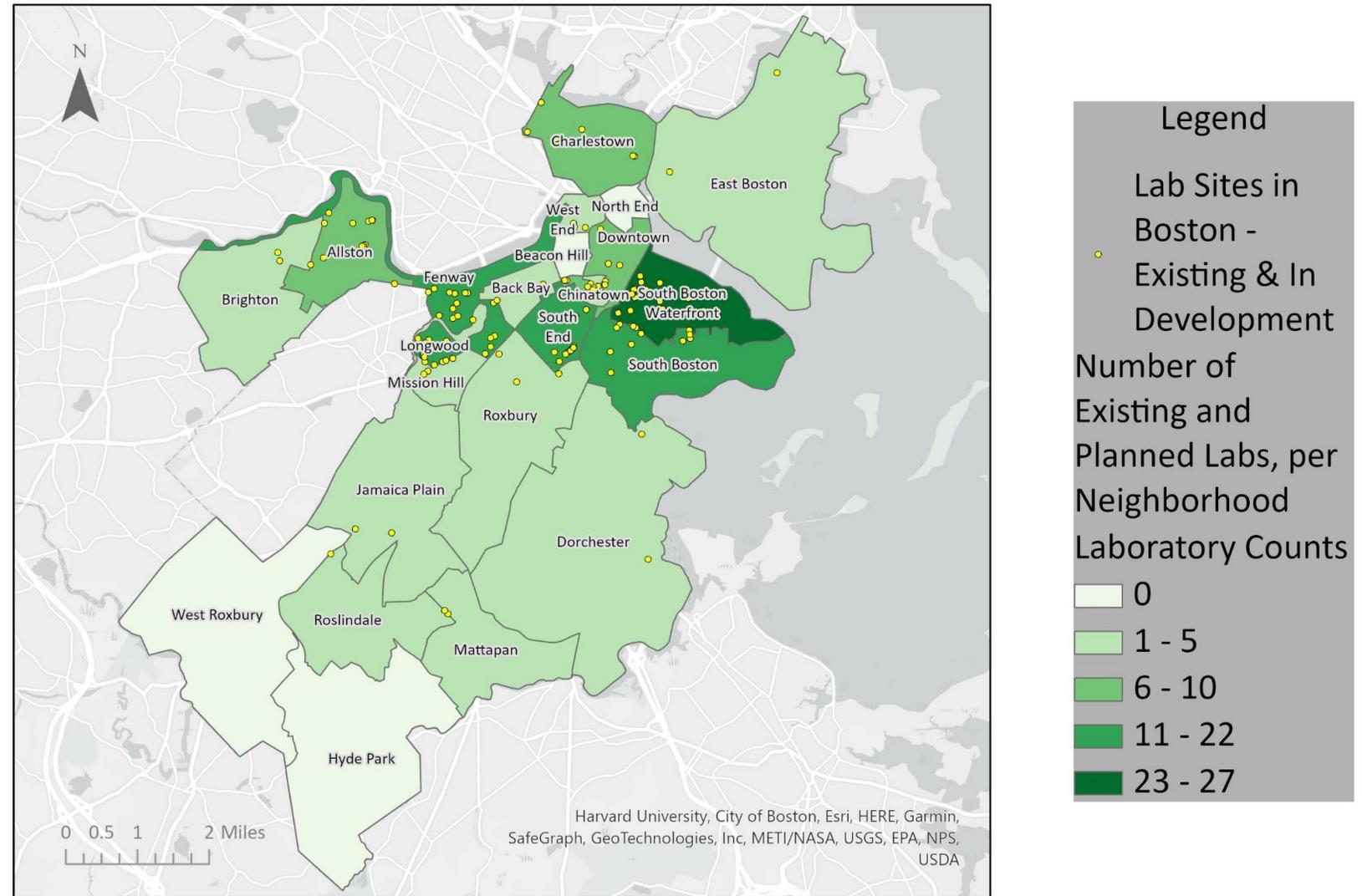
In Massachusetts there are **two job openings for every one unemployed person** – the tightest ratio of job openings to unemployed workers ever recorded.



# INDUSTRY CHALLENGE: GEOGRAPHICAL LABOR MARKET MISMATCH

The labor market is **most competitive in the Greater Boston area** where most of the industry is currently concentrated.

**Diversifying the geographical footprint** of the industry is essential to expand and diversity the industry's talent pipeline.



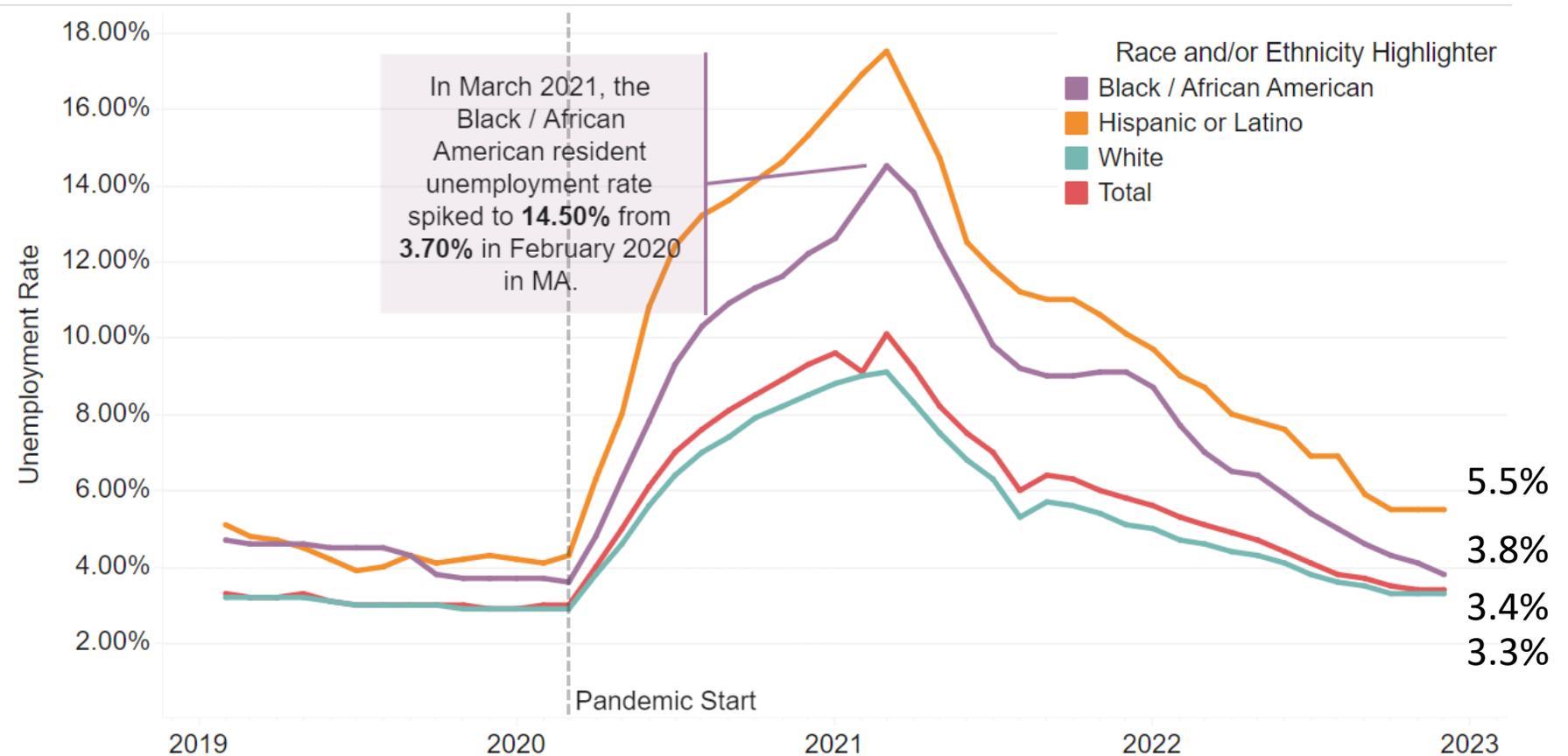
Source: BioConnects New England calculations based on BPDA list of existing and planned Lab facilities.

# BUT STILL NOT EVERYONE IS BENEFITTING EQUALLY....

## Massachusetts Unemployment Rates by Race/Ethnicity

The **unemployment rate for Black workers is 1.5 percentage points greater** than that of white workers.

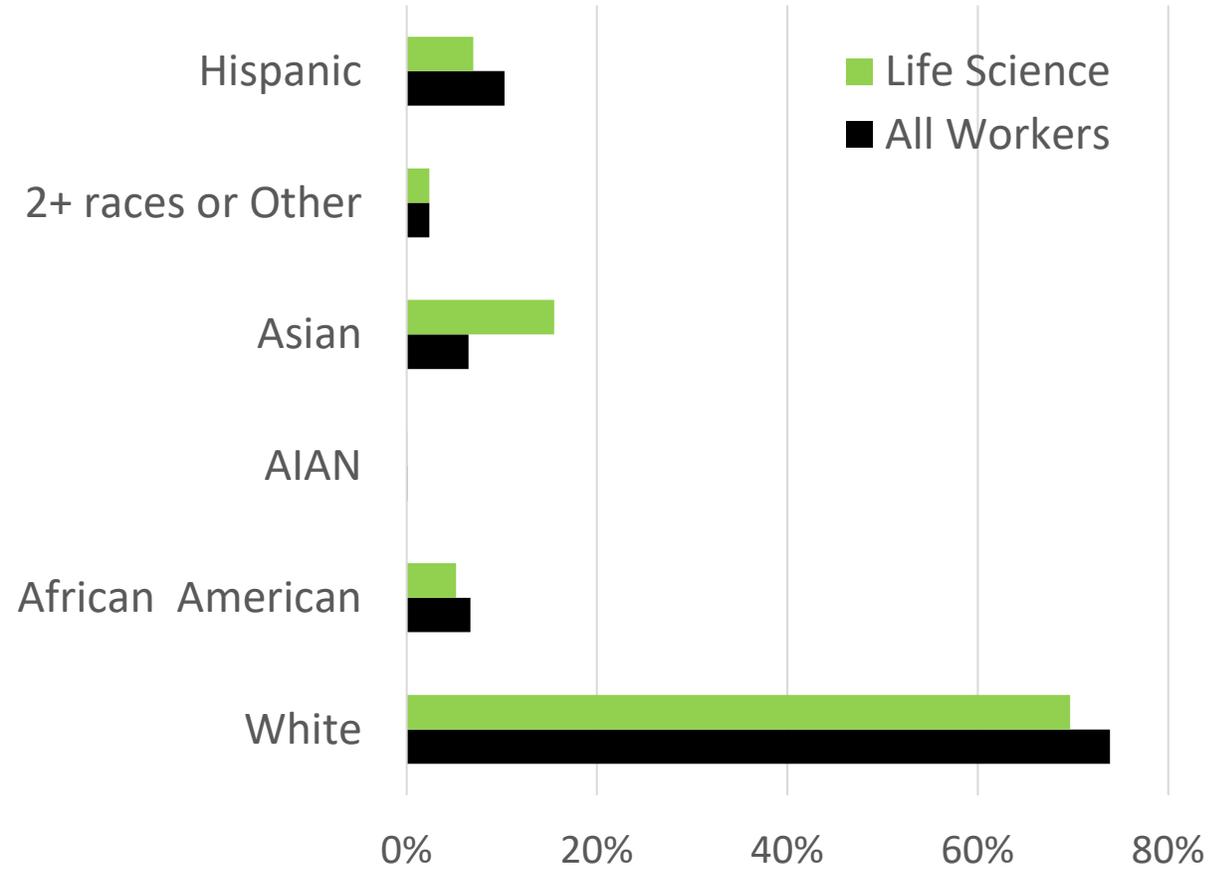
For Hispanic workers, the **gap was 2.2 percentage points** (two-thirds greater).



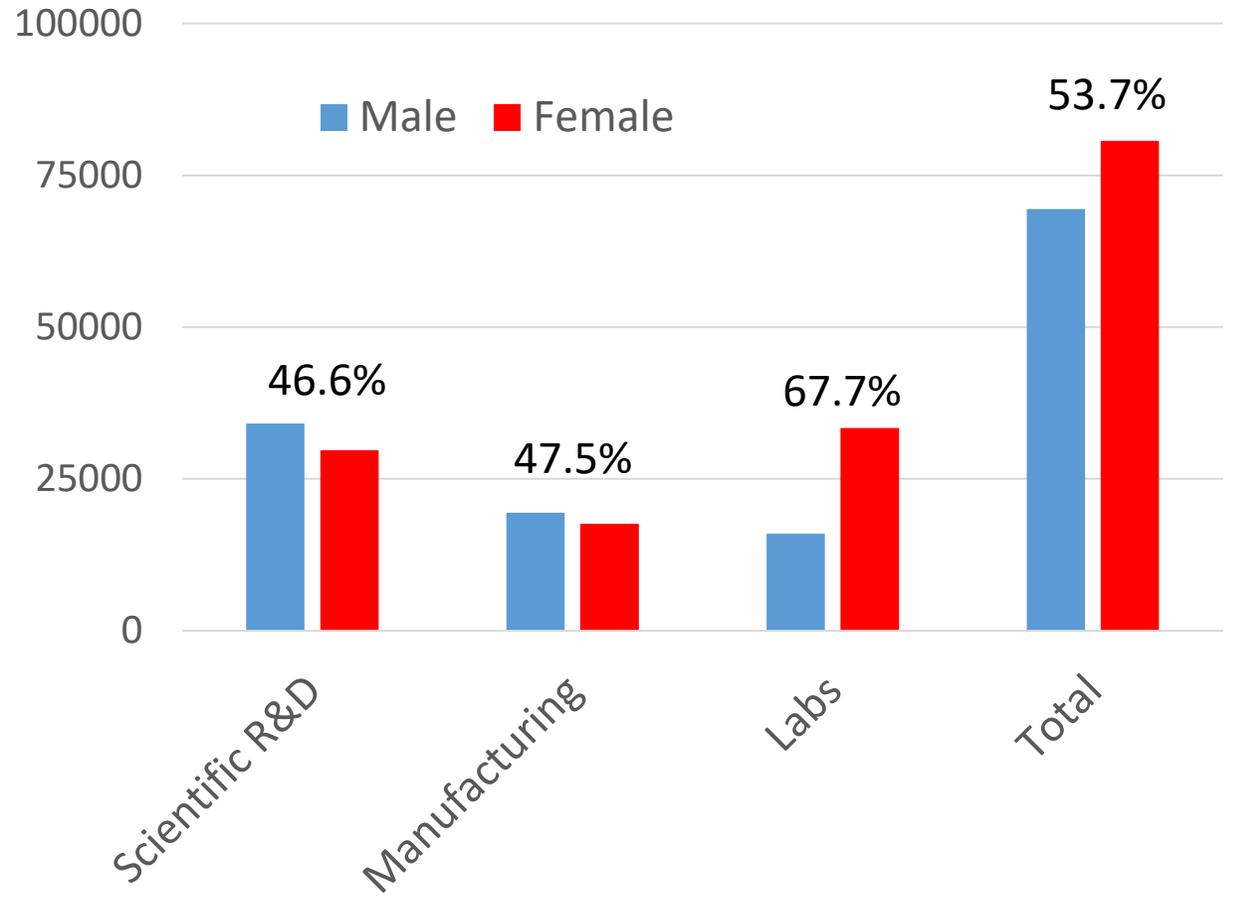
Source: Massachusetts Executive Office of Labor and Workforce Development.

# INDUSTRY CHALLENGE: LACK OF RACIAL AND GENDER DIVERSITY

### Race/Ethnicity Breakdown of Biopharma Workers, 2021



### Gender Breakdown of Biopharma Workers, 2021



Source: BPDA Research Division calculations using the American Community Survey.

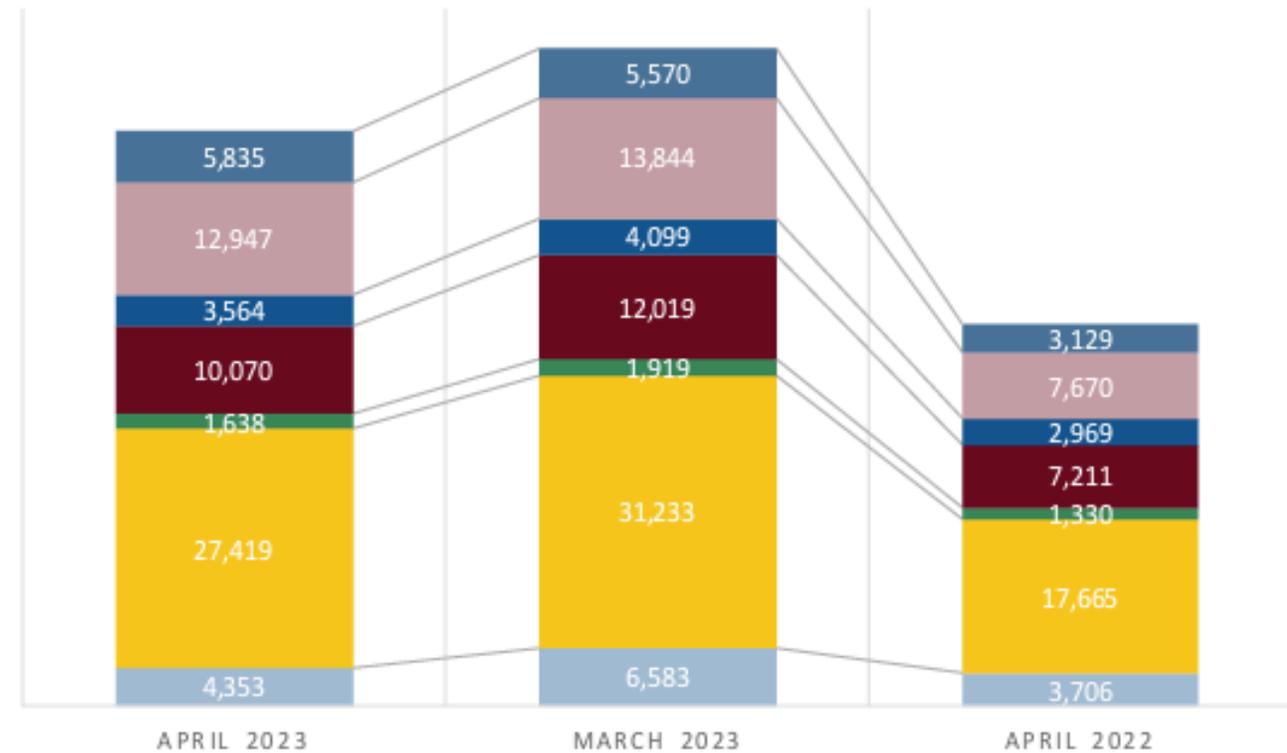
# THERE IS AN EDUCATION GAP BETWEEN JOB OPENINGS AND JOB SEEKERS....

Among MA job postings that list an educational requirement, **49% list a Bachelor's degree** as the minimum requirement.

Only **29% of unemployed workers in MA have a Bachelor's degree or higher.**

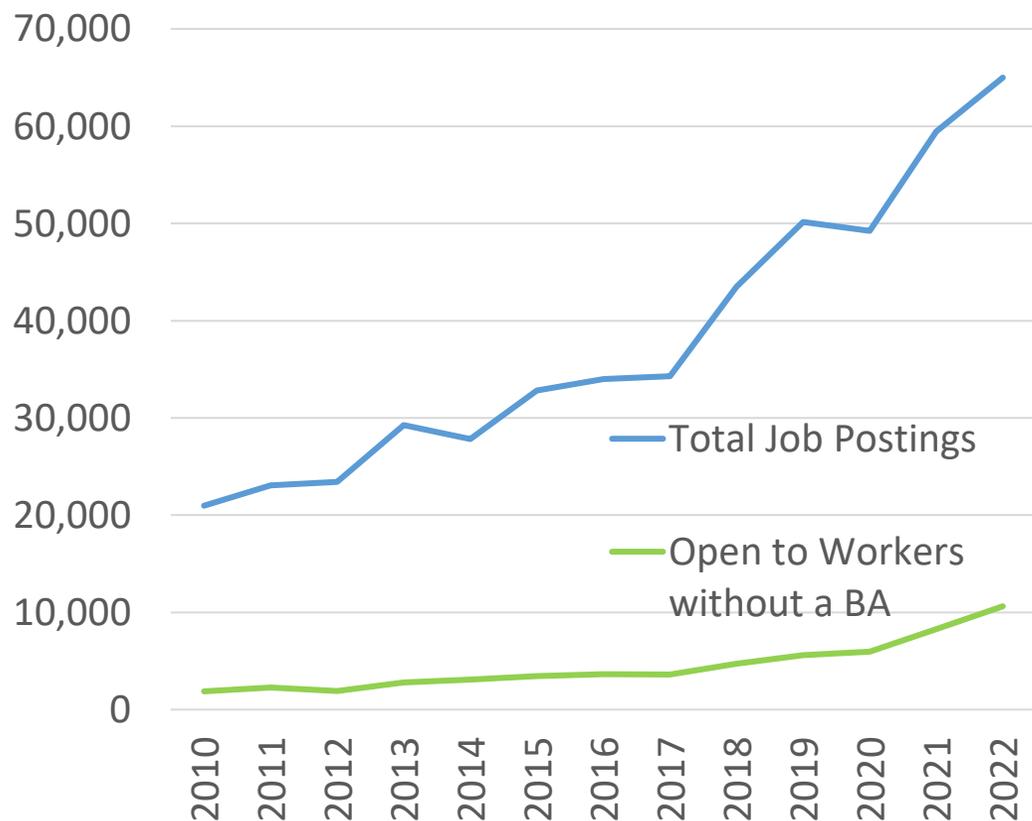
## Educational Distribution of Unemployment Insurance Claimants, April 2023

■ Less than High School ■ High School or GED ■ Vocational Training ■ Some College  
■ Associate Degree ■ Bachelor's Degree ■ Advanced Degree



# INDUSTRY CHALLENGE: OVER-RELIANCE ON HIGHLY EDUCATED WORKERS

**Share of Biopharma Job Postings  
Open to Workers without a Bachelor's Degree, 2022**



**Types of Biopharma Job Postings  
Open to Workers without a Bachelor's Degree, 2022**

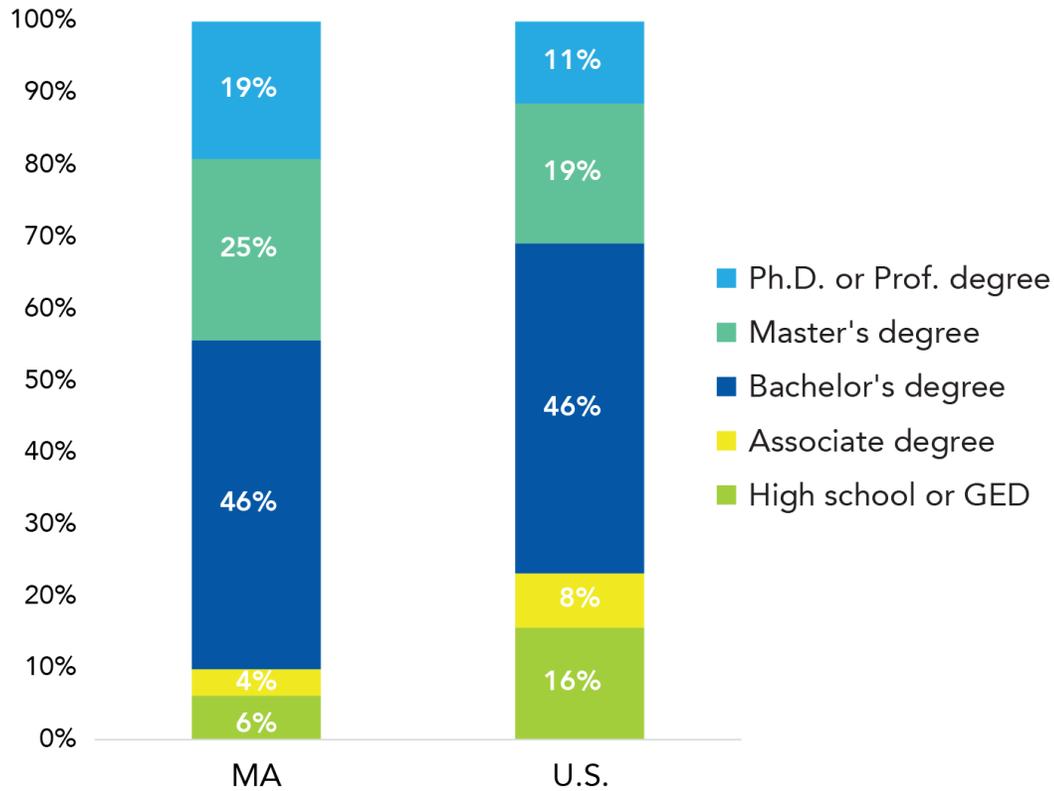
Job Titles	Number of Biopharma Jobs Posted	Share Open to Non-BA Workers	Entry Level Wage
Phlebotomists	353	94.6%	\$31,972
Nonfarm Animal Caretakers	84	76.4%	\$32,202
Laboratory Technicians	757	53.6%	\$35,528
Metrology Technician	188	55.6%	\$36,644
Biomanufacturing Technicians	323	58.3%	\$37,510
Clinical Trial Associate	168	37.8%	\$35,109
Medical Technologists	126	39.0%	\$47,965
Chemical Technicians	77	16.8%	\$40,468
Biological Technicians	147	16.9%	\$45,145
Quality Assurance Specialist	95	9.7%	\$38,285

Source: BPDA Research Division.

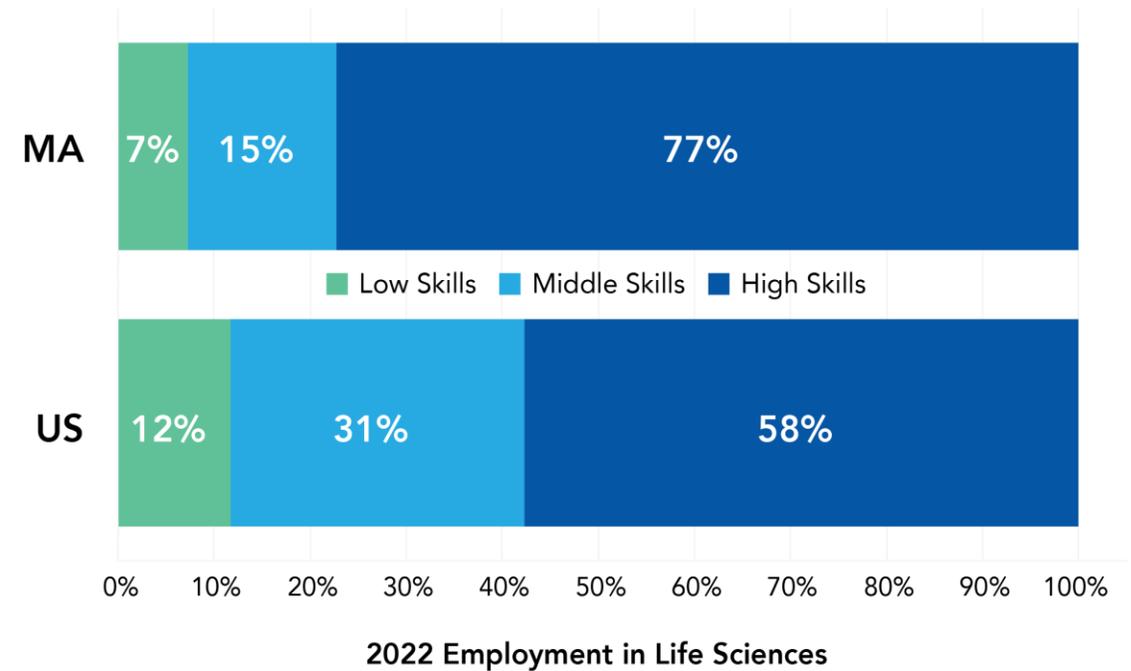
Note: Salary report used Burning Glass mean market salary for postings requesting 0-2 years experience, with a high school, vocational or Associate degree.

# MA Life Sciences Demand Oriented Toward Higher Levels of Education, with 44% of Postings Preferring Masters or Higher

**Education Requirements in Life Sciences  
Job Postings, 2019-22**



**Occupational Employment by Skills Levels Within MA  
Biopharmaceuticals & Medical Labs Industries, 2022**

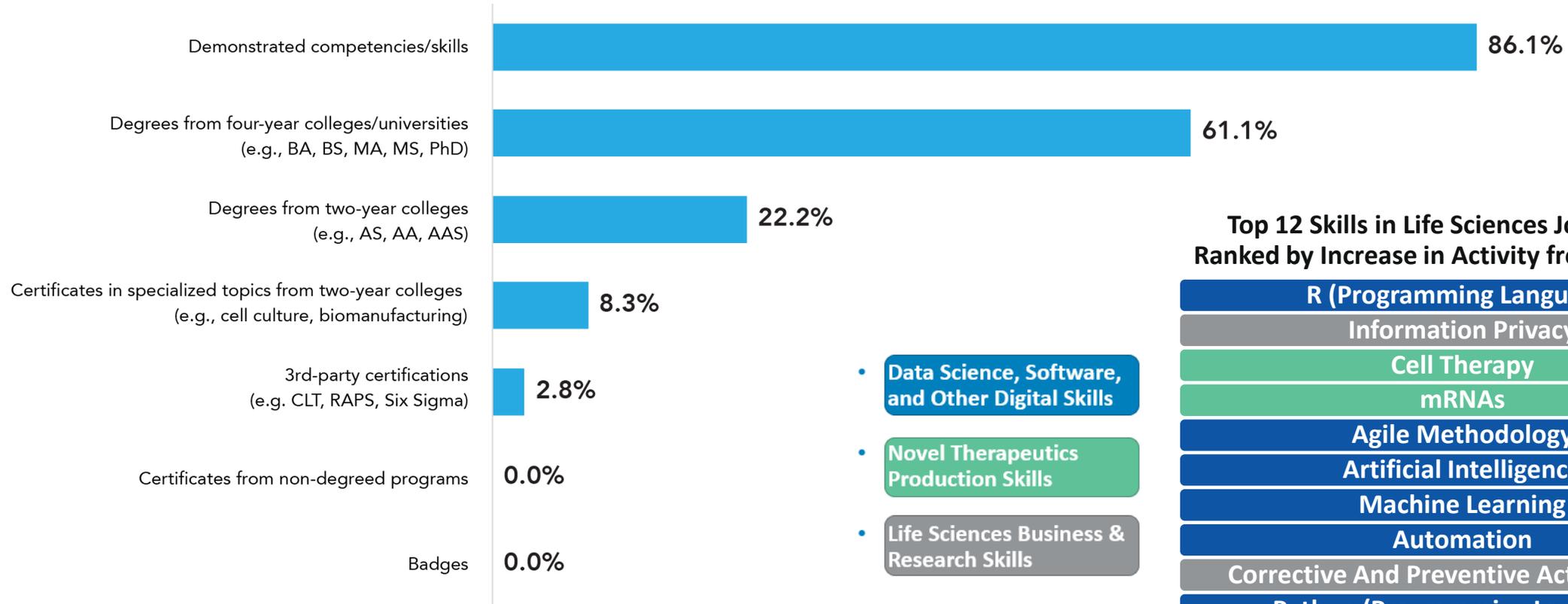


Note: Skills level determined from typical federal classifications of required education, training, and experience. "High skills" occupations typically require a bachelor's degree or higher, "middle skills" jobs typically require more education and/or experience than a high school education but less than a bachelor's degree, and "low skills" jobs typically require a high school education or less.

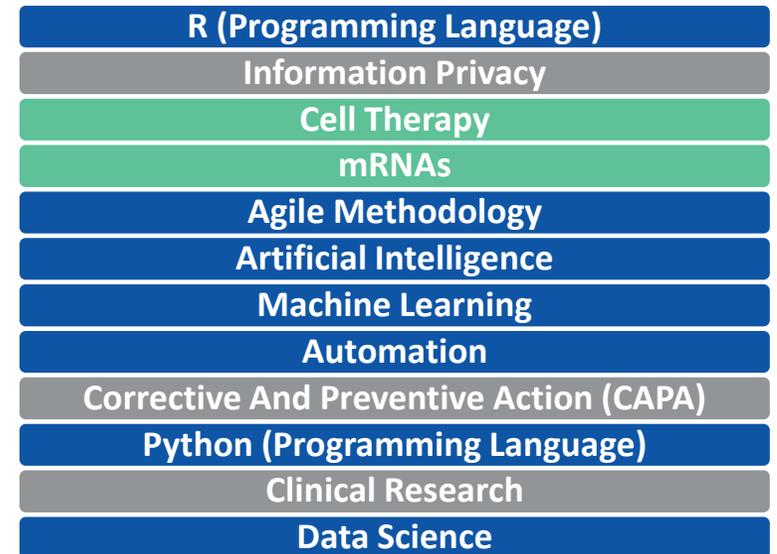
Source: TEconomy Partners' analysis of Lightcast Staffing Patterns Data, 2023.1

# Job Requirements for Entry-Level Positions at MA Life Sciences Companies Place Emphasis on Degrees, Often as a Proxy for Demonstrated Competencies

Share of Companies Surveyed Ranking Various Credentials as “Very Important” when it comes to hiring entry-level technical positions (e.g., lab or engineering technicians, skilled production workers, n = 36)



Top 12 Skills in Life Sciences Job Postings Ranked by Increase in Activity from 2019-2022



- Data Science, Software, and Other Digital Skills
- Novel Therapeutics Production Skills
- Life Sciences Business & Research Skills

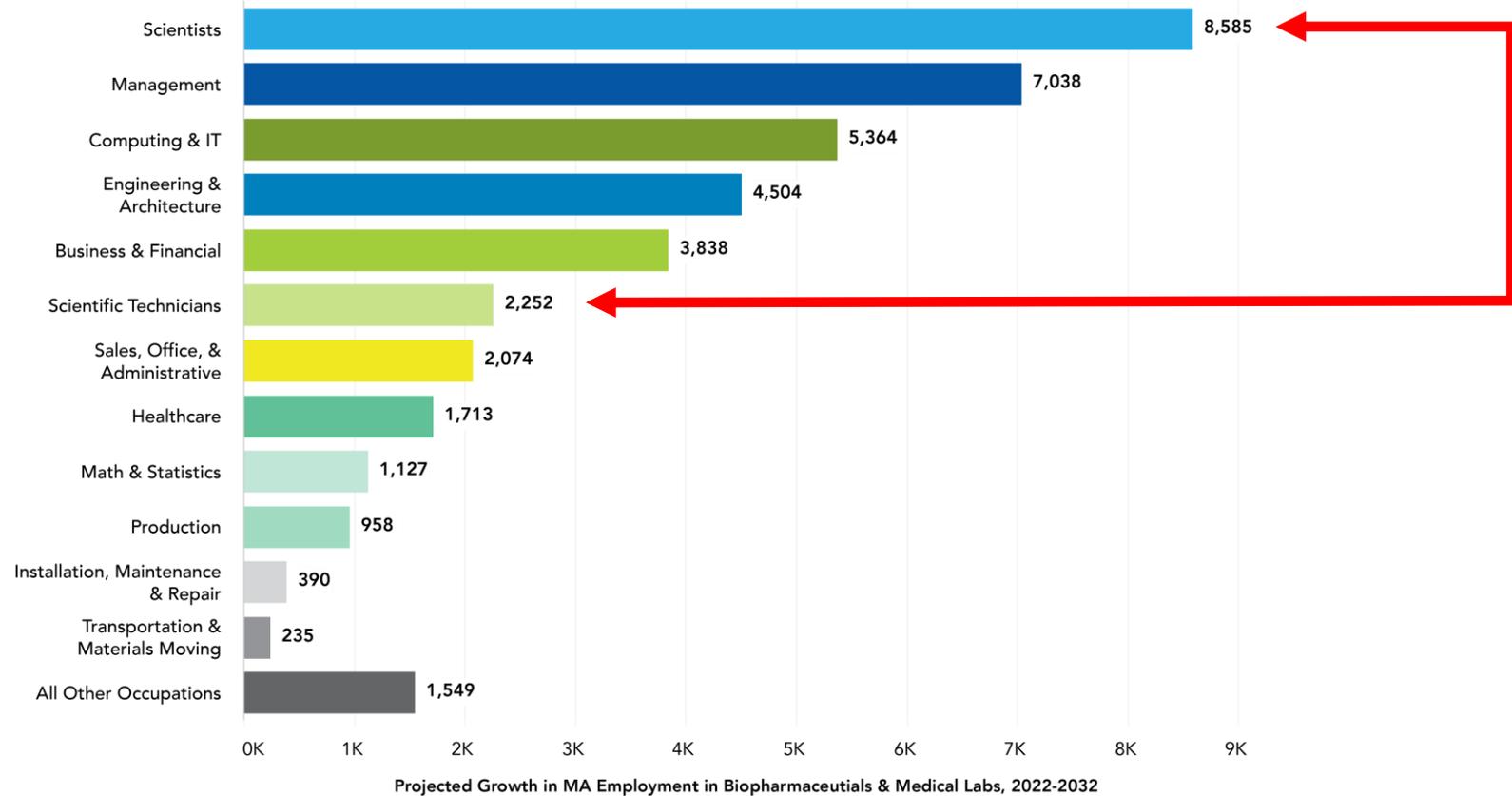
Note: postings data shown above includes only biopharmaceuticals and medical labs industry sectors  
Source: TEconomy Partners’ analysis of Lightcast, JPA Database, 2023.1.

# Yet Projected Growth Trends Reaffirm the Importance of Middle-Skills Scientific Technicians as well as High Skills Scientists for the Industry's Future

## Projected job growth in leading life sciences occupational segments over the coming decade

Scientists	35% growth
Management	34% growth
Computing & IT	49% growth
Engineering & Architecture	39% growth
Business & Financial	37% growth
Scientific Technicians	38% growth
Math & Statistics	56% growth

## Projected Occupational Growth Trends Within Biopharmaceuticals & Medical Labs, 2022-32

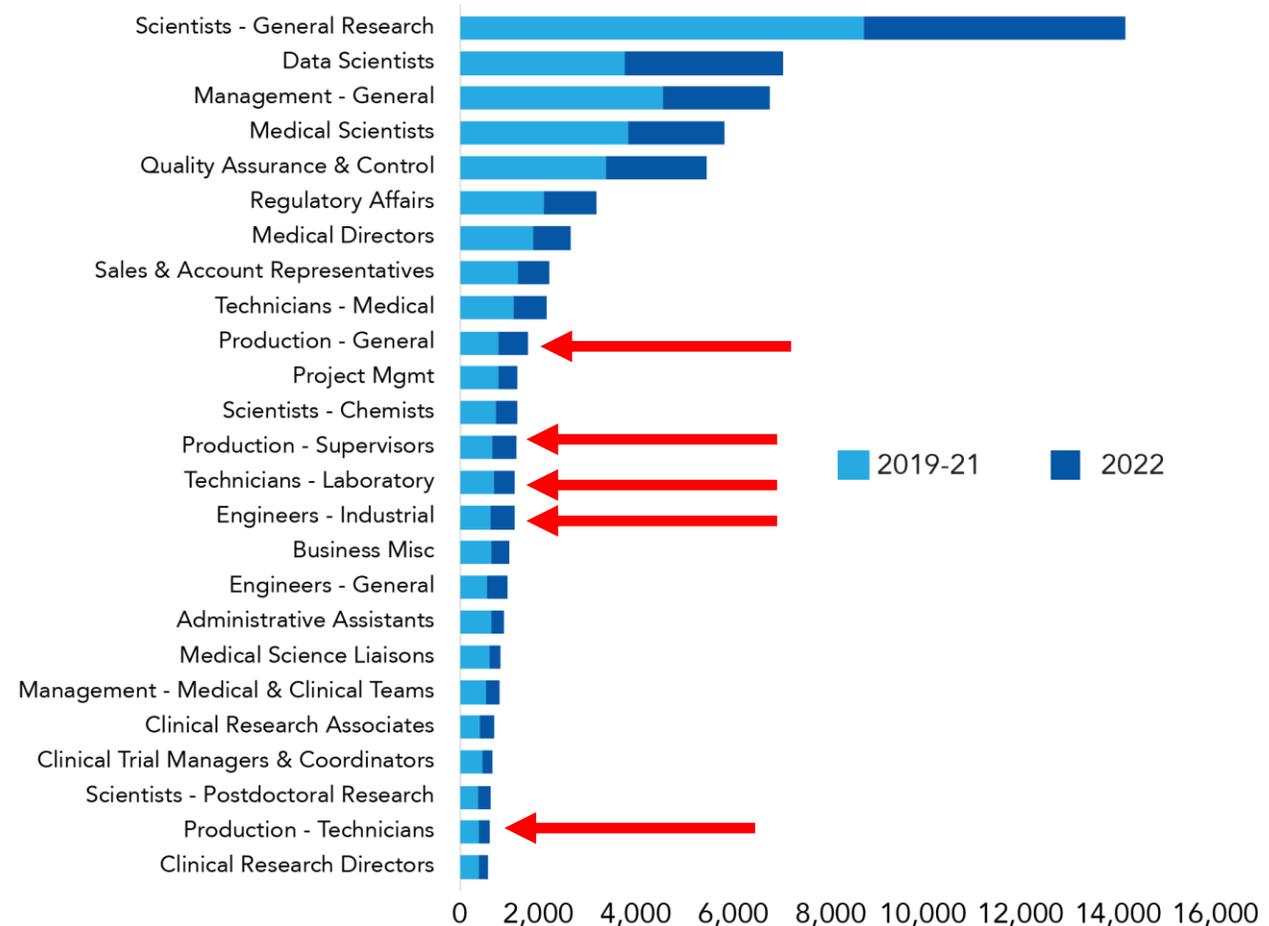


Segments listed with at least 1k projected new jobs and >30% job growth from 2022-2032

# Rising Production and Manufacturing Activity in Job Postings but from a Small Base compared to Increases in Data Scientists and Management

- Strong recent demand for production workers & supervisors; QC/QA; Industrial Engineers – **signs of rising manufacturing activity.**
- But from a small base number of jobs compared to the surge in posting activity for Data Scientists and Management positions.

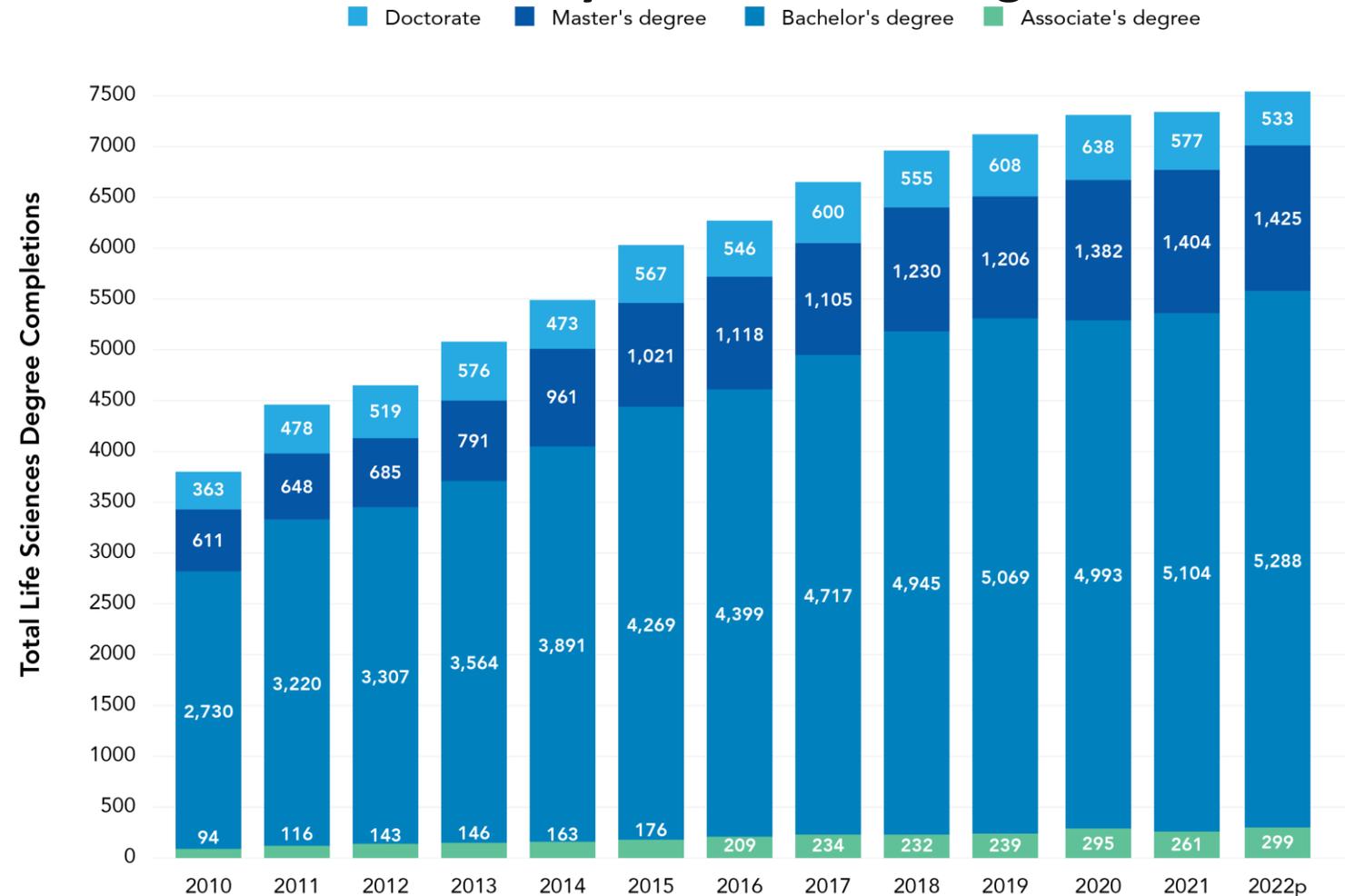
Leading Job Titles in MA Life Sciences Job Postings by Category, 2019-2022



# The Postsecondary Life Sciences Talent Pipeline Continues to Expand—but is Still Heavily Skewed towards Advanced Degrees

- Life sciences **degree production rebounded to 3% growth** in 2022.
- Yet the **share of Associate's degrees remains extremely low at only 4%** and that of Bachelor's degrees has fallen slightly to 70%.
- Since 2010 **Master's degrees have grown from 16% to 19%** of life sciences degrees awarded.

## Trend in Postsecondary Life Sciences Degree Grads in MA



# Future Pipeline Needs: Demand for Talent Continuing to Outpace the Supply for both Middle- and High-Skill Clinical Positions

- Projections indicate **6,617 average annual job openings** in life sciences occupations over next decade.
- In recent years, the state has produced on average **3,304 new life sciences graduates annually**.
- The misalignment of talent is **especially tight among life sciences technicians**.

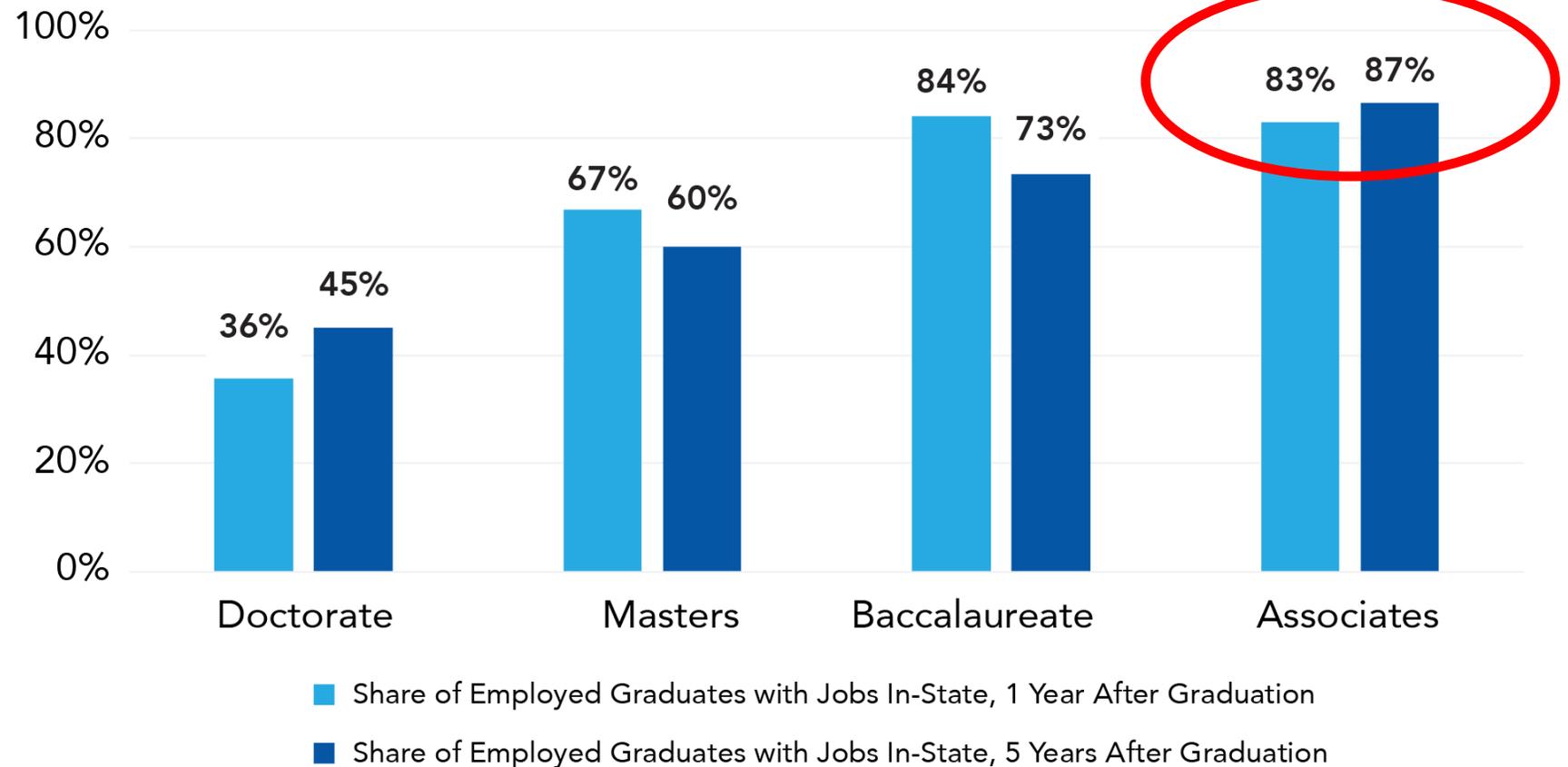
Comparison of Job Opening Trends for MA Primary Life Sciences Occupations vs. "Supply" of New Higher Education Degrees Generated

Primary Life Sciences Occupational Groups	Degree Levels Generally Required for Entry	MA Average Annual Degree Graduates in Relevant Fields, 2020-2022	MA Average Annual Job Openings, 2019-2022	Supply/Demand Ratio
Life Scientists	Master's & Doctorate	1,680	3,818	0.44
Life Sciences Technicians	Associate's & Bachelors	113	979	0.11
Medical & Clinical Lab Technicians	Associate's & Bachelors	803	1,329	0.60
Life Sciences Engineers (biomedical only)	Bachelor's & Higher	708	183	3.86

# Least Leaky Pipeline: Graduates of Public Institutions Have Relatively High Shares of Retention 1 to 5 Years Later, Especially Associate Degree Recipients

- MA public institutions report high in-state employment retention 1 year after graduation for Associate's and Bachelor's level degrees
- Retention 5 years after graduation is highest among Associate degree holders (87%).
- Retention is lowest among Doctorate recipients.

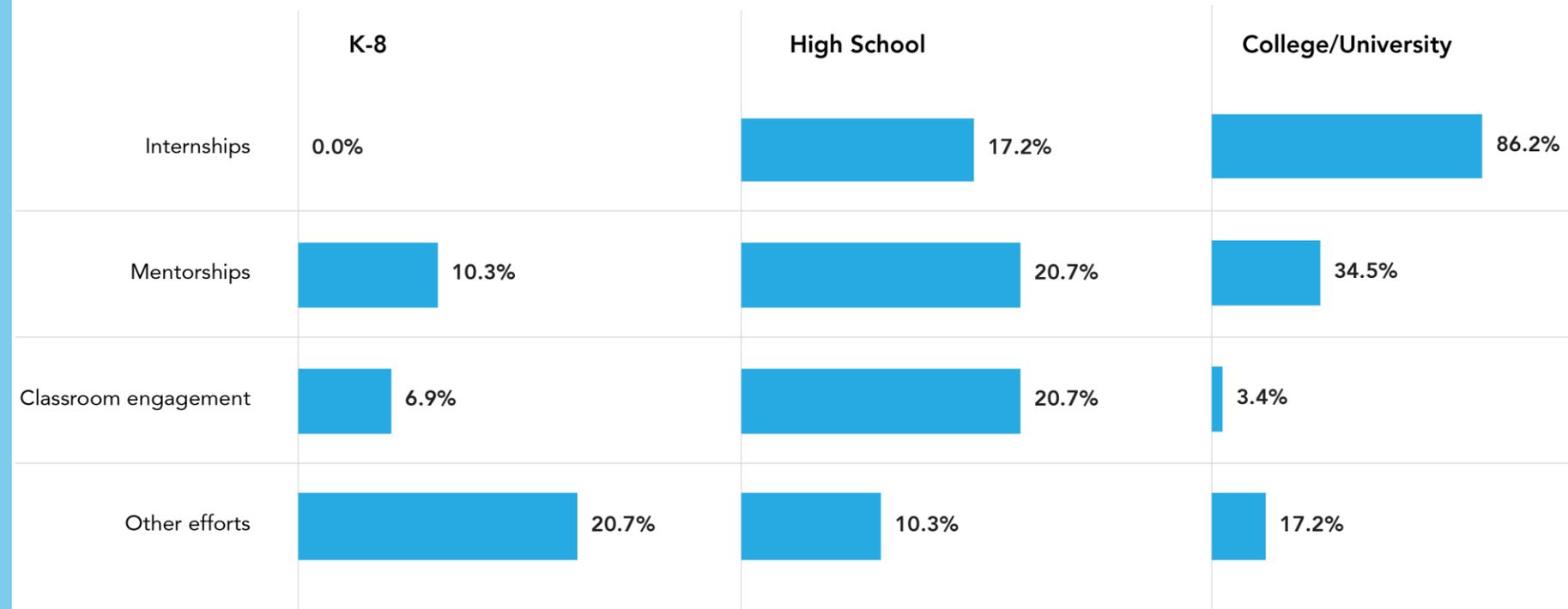
## Share of Life Sciences Degrees from MA Public Institutions Working In-State at 1 and 5 Years After Graduation



# Future Pipeline: MA Companies Engage Primarily at the Post-Secondary Level to Raise Career Awareness, but Less So Earlier in the Pipeline (K-12)

- **Only 21% of companies reported some efforts in K-12** pipeline development efforts.
- Traditional college internship models for building talent pipelines remain dominant.

Share of Respondent Life Sciences Companies with STEM Pipeline Initiatives by Education Level (n = 29)



# INDUSTRY OPPORTUNITY: NEED BOTH SCALE AND SCOPE TO MEET DEMAND



**Provide on/off-ramps** for workers across the career pathway pipeline

Community Engagement

Biotech Career Pathway  
Model: New Mission HS  
College Coaching  
Model: Success Boston

College Bridging  
Model: JVS, YearUp  
**Pipeline Programs**  
Model: Just A Start

Career Services  
Model: Metro North/ABCD  
Skills for RI's Future  
Mentorship Programs  
Model: Latinos in Bio

Career Services  
Model: MassHire  
Downtown Boston  
Real Jobs RI  
Business Development  
Model: BECMA

**Co-create an industry-aligned curriculum** to build relevant skills & link opportunities

Stackable Credentials

Vocational Technical Degree  
Model: Worcester Tech  
Dual Enrollment Credit  
Model: Roxbury CC

Certificate Programs  
Associate Degrees  
Models: Bunker Hill CC,  
Northern Essex CC, BFIT

**Certificate Programs**  
**Micro-Credentialing**  
**Bachelor's Degrees**  
Models: WPI, A2M, Roux

Certificate Programs  
Master's Degrees  
Ph.D. Degrees  
Model: UMass BTP

**Expand Learn & Earn options** to keep skills current & support learners

Experiential Learning

Summer Internships  
Models: Boston PIC,  
LEAH Knox Scholars  
Learning Labs  
Models: Biogen, Vertex, BioBuilder

**Registered Apprenticeships**  
Model: MassBioEd-  
NU/WPI  
Employer Training Programs  
Model: GMGI

Co-ops  
Model: Northeastern  
University, Educate Maine  
Internships  
Model: MLSC

Internships, Traineeships,  
Entrepreneurship  
Programs  
Models: Project Onramp,  
MassBio, Roux, Supply RI

**Remove barriers** for marginalized workers to improve DEI

Wrap-Around Services

Financial Support  
Model: A2M  
Career Coaching  
Model: YearUp

**Workplace ESOL**  
Model: JVS

Transportation Services  
Model: A2M

Childcare Solutions  
Model: OWD

Food Insecurity  
Model: Bunker Hill CC

Mental Health  
Model: MaineHealth

# 4th Recommendation: Industry, Workforce Programs, and Government



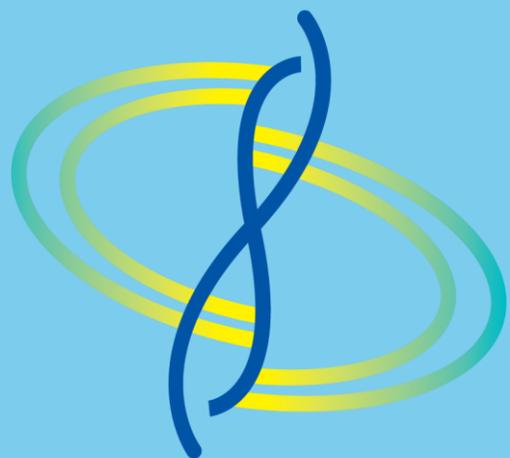
- Invest in skills-based and experiential learning workforce development programs to address areas of high demand and to engage non-traditional workers.
- Advance diversity, equity, and inclusion in the life sciences

# To learn more



Download the Full Report for

- **Regional Analysis**
- **Survey findings**
- **Interview highlights**
- **and more**



# Industry Best Practices to Attract and Develop Talent



Zach Stanley, *Moderator*  
*MassBio*

# Industry Best Practices to Attract and Develop Talent

The Future of the Biotech Workforce



Chris Garabedian

*Xontogeny*

# Industry Best Practices to Attract and Develop Talent



Marisa MacGauley  
*Bristol Myers Squibb*



Cory Siddon  
*Alnylam*



Michael Convicer  
*Biogen*



Jennifer Shevlin  
*Blueprint Medicines*



Kaye Cullum  
*Sanofi*



Jimmy Zhang  
*Takeda*



Angela Perkins  
*Gingko Bioworks*



Ahmad Hussin  
*Thermo Fisher Scientific*

2023 Massachusetts Life Sciences Conference  
Industry Best Practices to Attract and Develop Talent



Jennifer Shevlin  
*Blueprint Medicines*

# In just over a decade of relentless determination, Blueprint Medicines has become a global, commercial biotech

## OUR MISSION:

Make real the promise of precision therapy to extend and improve lives for as many people as possible



14 development candidates nominated



80% success rate from IND to clinical POC



5 breakthrough therapy designations



~4 years from IND to first approval



2 approved medicines



5 FDA approved indications



650 Employees in US & Europe



56% of the workforce are women



50% of Directors on our Board are diverse by Gender or race



# “ Change your thoughts and change your world.”

- Norman Vincent Peale

1

Change  
mindsets

2

Build  
new skills

3

Amplify the  
power of time



# 2023 Massachusetts Life Sciences Conference

## Industry Best Practices to Attract and Develop Talent



**Marissa MacGauley**

*Bristol Myers Squibb*

**Headquarters:**  
New York, NY

**1989 – Merger of Bristol-Myers and Squibb**

Bristol, Myers and Squibb Prior Incorporation Dates

1858 – Edward Robinson Squibb, MD

1887 – William McLaren Bristol and John Ripley Myers

**50+**  
Investigational  
Therapies

**20**  
Internal  
Manufacturing and  
Development Sites  
around the world



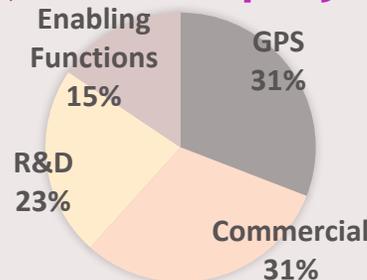
**Our Patients** are at the center of everything we do

At Bristol Myers Squibb, we are working together for patients. We are proud of the work we do and are driven by an urgency to serve our patients. We are inspired by our patients, whose courage and determination to prevail never ceases to amaze us.

**8 PBRG's** (People and  
Business Resource Groups)  
with over  
22,000  
members in 44  
countries

Sites in more  
than **50**  
countries  
worldwide

**34,000+ Employees**

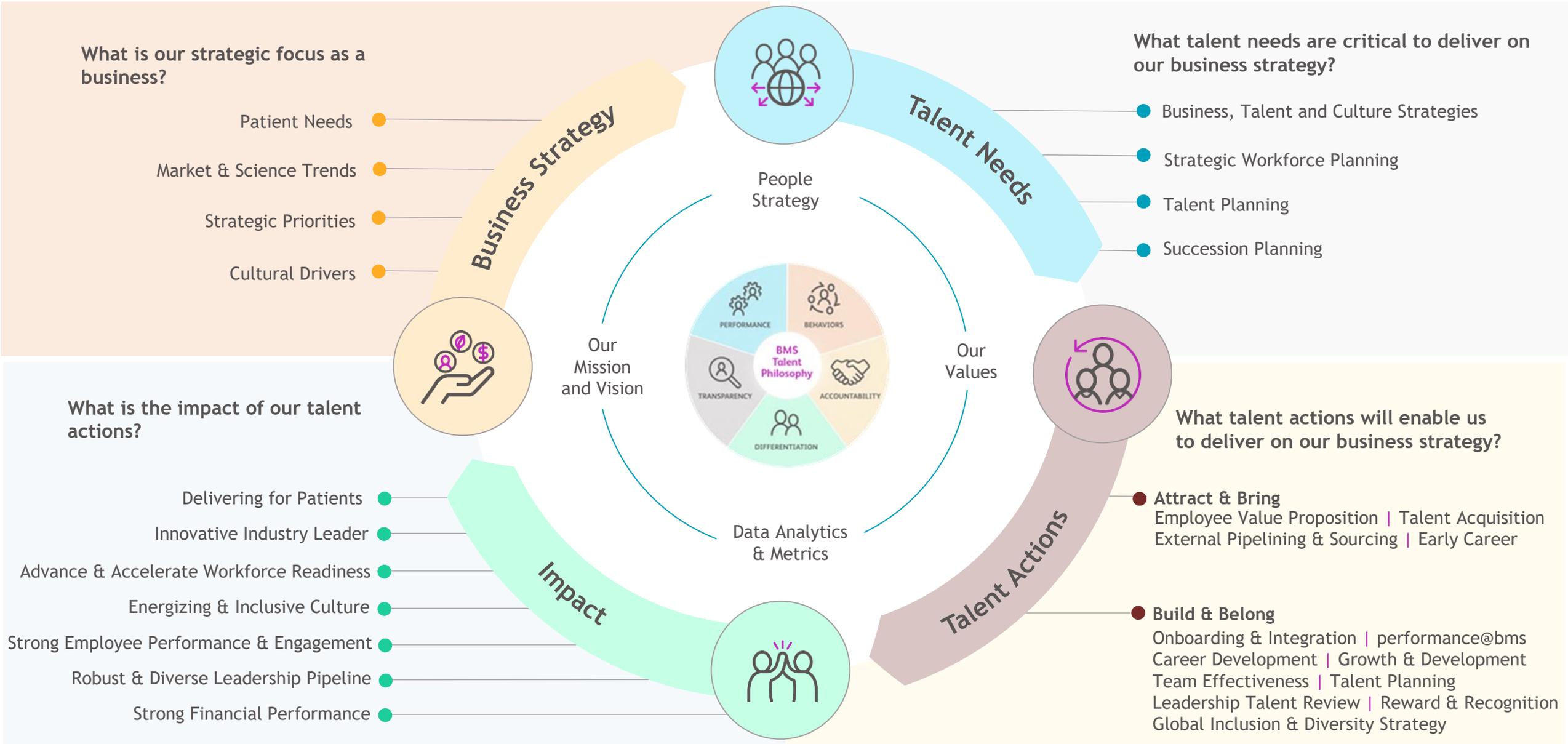


**3 Drug Platforms**



# The BMS Integrated Talent Strategy

Getting the right people, in the right role, at the right time, to deliver our business strategy for our patients.



2023 Massachusetts Life Sciences Conference  
Industry Best Practices to Attract and Develop Talent



Kaye Cullum  
*Sanofi*

# Sanofi U.S./MA Presence and Focus

Chasing the miracles of science to improve people's lives

**13K**  
EMPLOYEES ACROSS  
THE U.S.

**4K**  
EMPLOYEES  
IN MA

**€18.3 BN**  
IN U.S. NET SALES IN 2022



**€5.7 BN**  
INVESTED IN R&D IN 2021,  
REPRESENTING  
15.1% OF GLOBAL SALES<sup>1</sup>



**3 Core GBUs:**  
SPECIALTY CARE  
GENERAL MEDICINES  
VACCINES

**1 Stand-Alone:**  
CONSUMER HEALTHCARE



20+ U.S. locations. In MA: Manufacturing and Supply operations in Framingham and Northborough, new headquarters in Cambridge (comprised of R&D and office) and center of excellence (R&D) in Waltham.



<sup>1</sup> Approximate figures

# Build an ecosystem that serves education and industry



## 1) Partnership

Bring together educators and industry leaders for the future



## 2) Curriculum

Design curriculum that is not only good for students no matter where they go in the world



## 3) Employment

Internships – Co-Ops - Alumni



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Cory Siddons  
*Alnylam*

# Anylam Pharmaceuticals

As a fully integrated biotech company founded in 2002, Anylam has led the translation of RNAi (RNA interference) from Nobel Prize-winning discovery into an innovative, entirely new class of medicines.

### Commercial Portfolio

onpattro (patrisiran) lipid complex injection 30 mg/5 mL

amvuttra (vutrisiran) injection 25 mg/0.5 mL

GIVLAARI (givosiran) injection for subcutaneous use 189 mg/mL

OXLUMO (lumasiran) for injection 14.5 mg/0.5 mL

LEQVIO (inclisiran) injection 284 mg/1.5 mL

### Global Market Presence

- Customer-facing organization with strong track record in launches & organic growth
- Clinical development & regulatory expertise in all key markets including U.S., EU & Japan
- Robust manufacturing & supply chain capabilities

23 Direct

24 Distributor

### High-Yield Pipeline

Drug	Indication	Phase	Region
OXLUMO	Primary Hyperoxaluria Type 1*	Phase 3	Global
LEQVIO	Hypocholesterolemia*	Phase 3	Milestones & up to 20% Royalties*
amvuttra	hATTR Amyloidosis with PIV	Phase 3	Global
Patrisiran	ATTR Amyloidosis with CM	Phase 3	Global
Vutrisiran	ATTR Amyloidosis with CM	Phase 3	Global
ALN-TTRsc04*	ATTR Amyloidosis	Phase 3	Global
Fitasiran*	Hemophilia	Phase 3	15-30% Royalties
Cemdisiran (+/- Pozelimab)*	Complement-Mediated Diseases	Phase 3	Global; Milestone/Royalty
Selcesiran*	Alpha-1 Liver Disease	Phase 3	Ex-U.S. option post-Phase 3
ALN-HBV02 (VIR-2218)™	Hepatitis B Virus Infection	Phase 2	50-50 option post-Phase 2
Zilebesiran*	Hypertension	Phase 2	Global
ALN-HSD*	NASH†	Phase 2	Royalty
ALN-APP*	Alzheimer's Disease; Central Nervous System	Phase 1	50-50

### Self-Sustainable Platform

IKARIA™ 12 months

+ Our Future Health

# Attracting, Developing, and Retaining Biomanufacturing Talent

Foundational Operating Principles



Manufacturing Operations Perspective



Biomanufacturing operations are **highly complex**, **highly regulated**, **fast-paced** environments that require intricate **collaboration** and open **communication** to be successful in delivering therapies to patients

- Highly trained, technical, and diverse workforce
- Safety first, quality always
- Unique site team culture based on company values
- Perpetual learning and technical training
- Continuous improvement mindset
- Educational pathways from certificates to PhD
- For non-traditional education or work history background, identify key transferable skills

# 2023 Massachusetts Life Sciences Conference

## Industry Best Practices to Attract and Develop Talent



Angela Perkins  
*Ginkgo Bioworks*



**GINKGO**  
**BIOWORKS**

Leading horizontal platform  
for cell programming

Founded in 2008

In 2021, began trading publicly  
on the NYSE (\$DNA) after raising  
\$1.6 billion

Headquartered in Boston with labs  
and offices in California, Australia,  
France, the Netherlands, and  
Switzerland

1,300+ Bioworkers



# Early & Non-Traditional Talent Pipelines

Early ID  
CULTIVATE FELLOWSHIP

INTERNS & CO-OPS  
3-6 MONTH PROJECTS

APPRENTICES  
12 MONTH OJT

## REDUCING MARGINALIZATION

**\$1M Commitment**

**Undergraduate Black STEM Scholars**

**Exposure to Career Pathways**

**Professional Networking & Mentorship**

**3-year Scholarship**

Diversity-first recruitment strategy

Development & mentorship as the foundation of experience

Outcomes based with real world application

Current enrollment in BS - PhD programs

In partnership with MassBioEd

Roles within Process Engineering & Foundry Operations



# 2023 Massachusetts Life Sciences Conference

## Industry Best Practices to Attract and Develop Talent



**Ahmad Hussin**  
*Thermo Fisher Scientific*

# World leader in serving science

ThermoFisher  
SCIENTIFIC

thermo  
scientific

applied  
biosystems

invitrogen

fisher  
scientific

unity  
lab services

patheon

PPD



>125,000  
colleagues



7,000  
R&D scientists/engineers



\$1.5B  
R&D investment



>\$40B  
revenue



>60 sites  
23 Countries

We enable our customers to make the world healthier, cleaner and safer

# Talent Attraction & Engagement Strategies

Improving the colleague experience from day one



## Purpose & Belonging

- Embracing Vision & Mission
- Making Our Impact Visible
- Business Resource Groups (BRGs)



## Career Development

- Defined Career Pathways
- Creating Value Through Opportunities



## Work-Life Integration

- Flex/Hybrid Options for Non-Essential Colleagues
- Community Impact & Social Responsibility
- STEM

We enable our customers to make the world healthier, cleaner and safer  
Serving > 1,000,000 patients per day  
Grow with Us

# 2023 Massachusetts Life Sciences Conference

## Industry Best Practices to Attract and Develop Talent



Michael Convicer

*Biogen*

# Best University Talent Acquisition Practices and Tips from Biogen

**1**

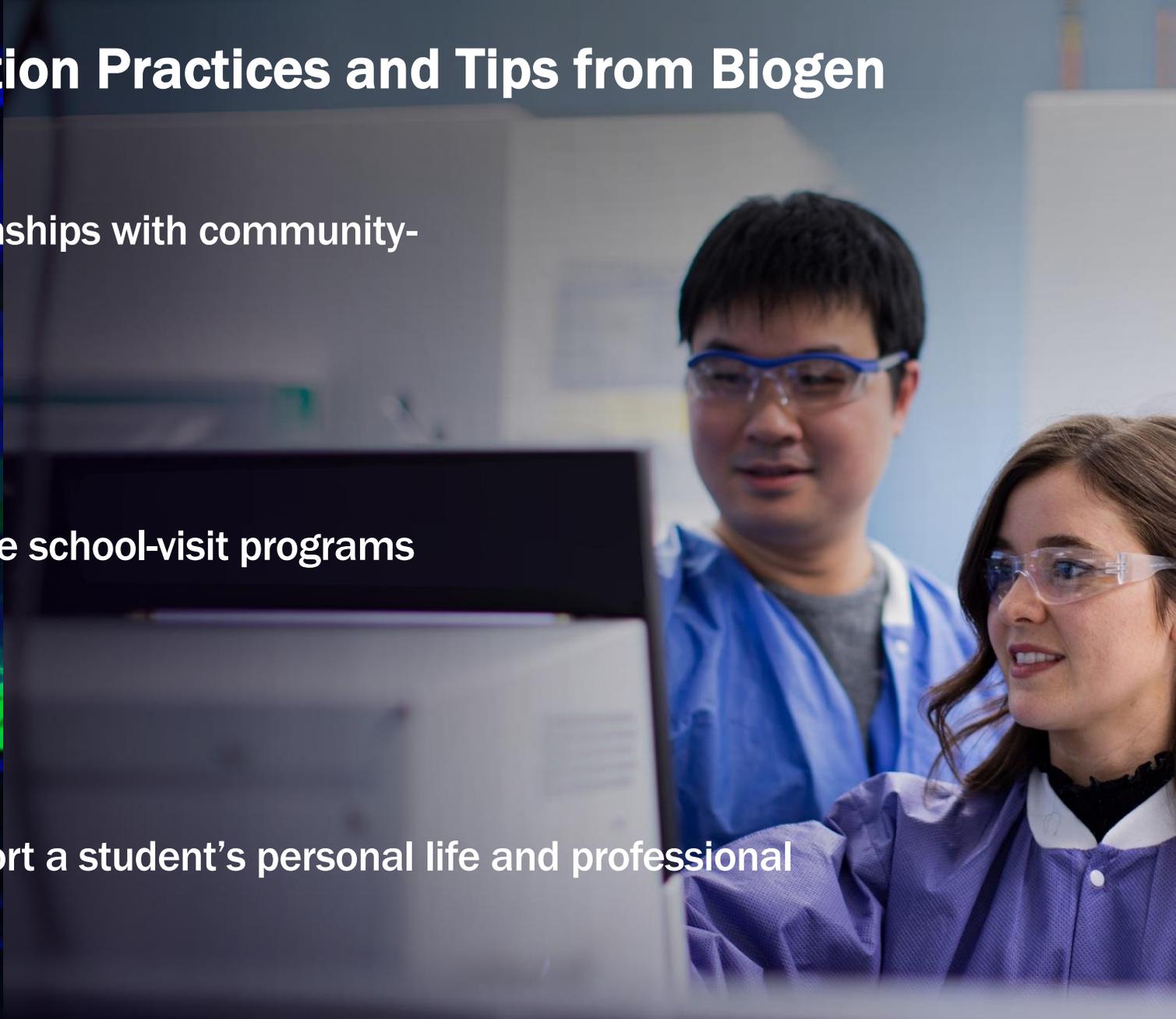
Establish intermediary relationships with community-based organizations

**2**

Building and facilitating routine school-visit programs

**3**

Presenting benefits that support a student's personal life and professional development



# Biogen: Who We Are

Biogen has continued to innovate in neurological pharmaceuticals, launch new therapies and advance a robust portfolio of treatment options that support patients with different needs

**1978** Founded

**2** Founders are Nobel Laureates

**102** Countries receive our products

**100%** Renewable power commitment

**9,000+** Employees Worldwide\*

**\$14.4B** in revenue

**39** Direct affiliate markets

**2** Manufacturing sites in North Carolina and Switzerland\*\*\*

# 2023 Massachusetts Life Sciences Conference

## Industry Best Practices to Attract and Develop Talent



**Jimmy Zhang**  
*Takeda*

# Takeda, a Global Biopharmaceutical Company

HEADQUARTERS  
**TOKYO, JAPAN**

GLOBAL HUB  
**CAMBRIDGE,  
MA, USA**

**40** NEW MOLECULAR  
ENTITY CLINICAL  
STAGE ASSETS

PRESENCE: APPROX. IN  
**80** COUNTRIES  
& REGIONS

**30+** MANUFACTURING  
SITES

**3** RESEARCH  
SITES

**200+**  
PARTNERSHIPS TO HELP  
US BRING INNOVATION  
TO PATIENTS

TOP EMPLOYER® IN

**39**

COUNTRIES & 4 REGIONS

FY21 REVENUE



\* Convenience translation of reported JPY figures into USD at an average rate of 121.44 JPY/USD. FY2021 revenue amount as of March 31, 2022.



FOUNDED IN

**1781**

OSAKA, JAPAN

**OUR  
PEOPLE**



# Industry Best Practices to Attract and Develop Talent



Marisa MacGauley  
*Bristol Myers Squibb*



Cory Siddon  
*Alnylam*



Michael Convicer  
*Biogen*



Jennifer Shevlin  
*Blueprint Medicines*



Kaye Cullum  
*Sanofi*



Jimmy Zhang  
*Takeda*



Angela Perkins  
*Gingko Bioworks*



Ahmad Hussin  
*Thermo Fisher Scientific*



MassBioEd

Networking Break

*Programming Returns*

*at 11:30 AM*

# Looking Outside the Box: Accessing Untapped Talent

## Three Successful Partnerships: Education Providers Working with Industry



**Jeanne LeClair, *Moderator***  
*Mass Life Science Center*

# Looking Outside the Box: Accessing Untapped Talent

## Three Successful Partnerships



Marc Creegan  
*Thermo Fisher  
Scientific*



Dany Bassous  
*Takeda*



Kwesi Foster  
*Quinsigamond  
Community  
College*



Germaine  
Palmer  
*MassBioEd*



Sarav  
Narayanan  
*Takeda*



Jorgo Tolkuci  
*AbbVie*



Wendell Tanks  
*Takeda*



Jared Auclair  
*Northeastern  
University*



Lorena Hoxhalli  
*AbbVie*



MassBioEd

Lunch

*Programming Returns*

*at 1:10 PM*

# Public Policies: How Do Industry, Government, and Educators Work Together to Prepare Talent for 2023?



*Secretary of Labor  
And Workforce  
Development*  
Lauren Jones



Chris Garabedian  
*Xontogeny*



Philip Sisson  
*Middlesex  
Community College*



Kenn Turner  
*Massachusetts Life  
Sciences Center*



Emerson Foster  
*Takeda*



Matt Fenlon  
*University of  
Massachusetts  
Boston*



Mike Firestone  
*City of Boston*



Sunny Schwartz  
*MassBioEd  
Moderator*

# Thank You



Lauren Celano

*Chair, MassBioEd Board of Directors*

# Breakout Sessions

Industry – Educator Advisory Session

Reducing Structural Inequity Through  
Systems Design and Workshop



# Dessert and Networking Reception

## Alumni Lounge